

## Lower Prices Are GM's Aim



Alfred P. Sloan, Jr.  
". . . real selling prices  
themselves must be  
reduced . . ."

### Leaf Spring Suspension Interests Car Makers

Considerable interest has developed among car manufacturers in the independently sprung car developed by the Leaf Spring Institute, that association reports. An independent check-up among independent car manufacturers indicates that two companies will probably use a suspension based on this design in their 1934 models, while there is a possibility that two others may also adopt the design or a modification thereof.

Reports circulating in the industry indicate that the Leaf Spring Institute has carried their experimental work several steps farther and an important announcement is expected from the association within the next few weeks.

### NRA Rules Car Radios Are Automotive Merchandise

NRA has ruled that automobile radios are automotive merchandise as defined in the Wholesale Automotive Code, according to a bulletin issued by the Code Authority. Jobbers have consequently been instructed that in submitting their statements of annual volume on which assessments for code expense will be based, they are to include automobile radio sales.

## Sloan Holds Cuts Key to More Sales; Profits In Efficiency

by Don Blanchard  
Editor, *Automotive Industries*

With two such outstanding leaders as Alfred P. Sloan, Jr., and Henry Ford now on record that present economic conditions call for lower car prices, a resumption in the downward trend of list prices which was interrupted by this year's increases, appears to be more than a possibility.

### More Local Unions Secede From A. F. L.

#### GMC Truck and Fruehauf Trailer Employees Vote to Resign Affiliation

The secession of labor unions in automotive plants from the A. F. of L. continues this week with the locals in the G.M.C. Truck plant and Fruehauf Trailer voting to quit their association with the parent body. The Chevrolet local, however, followed the lead of the Fisher Body group at No. 1 plant and voted to retain membership in the national organization.

Considerably more than 10,000 workers are said to be involved by the secession of the G.M.C. and Fruehauf employees in combination with the Hudson and Oldsmobile locals, which left the A. F. of L. last week. The G.M.C. secessionists have applied for charter membership in the newly formed Associated Automobile Workers of America according to Arthur E. Greer, chairman of the Hudson local. Mr. Greer also announced late this week that applications for membership in the new combine have been received from 15 other local groups within the automotive industry.

The Fruehauf employees, so far as known, have not signified any intention to become affiliated with the AAWA. It is reported that about 60 employee members of the old Olds A. F. of L. local have organized themselves, elected officers and decided to stay with the Federation.

Mr. Sloan expressed himself in unequivocal terms in his June 30 report to the stockholders of the General Motors Corporation in which he said: "The objective should be not merely a more favorable relationship of cost to selling prices, but what is of more vital importance, real selling prices themselves must be reduced—they must be brought within the range of a greater number of buyers. In no other way can industry be stimulated to higher levels of activity—in no other way can the unemployment question be intelligently attacked—at least that is the thinking of General Motors and its approach to the problem."

This is very much the same viewpoint that Mr. Ford expressed in April when many manufacturers announced higher prices following wage increases. At that time Mr. Ford said: "It is pretty certain that everybody will be looking for a plan to reduce prices before we can say that business is getting back where it should be."

Both Mr. Sloan and Mr. Ford appear to be in agreement that the great task confronting automotive management is to increase efficiency so that higher wage and material costs can be absorbed and still permit lower selling prices. As Mr. Sloan sees it, this task "should be looked upon as a challenge and an incentive to regain what has been lost, to establish even higher standards of operating efficiency, on the one hand, and to develop new and more effective products on the other."

Executives of independent automobile companies whose reactions to Mr. Sloan's statement were sought by *Automotive In-*

dustries held that lower prices were not in the wood under present conditions. With increasing material and labor costs, they were unanimous in pointing out, final car costs are of necessity higher and were being reflected in lowered profit margins, even by the few corporations who made money in the first half of the year.

"I don't see how we can build our automobiles any cheaper next year than now so long as we build the same kind of automobiles we are now building," one executive stated. "Neither can we sell them any cheaper."

Another executive, head of a car company, told *Automobile Industries* "With increasing costs GM profits as well as those of other manufacturers have gone down. Of course, dealers' margins might be cut, but the dealer code is none too strong now and, if wild trading should start again, discounts can't be reduced if dealers are to survive."

Further attempts to reduce the spread between list and delivered prices by lowering charges for accessories, handling, etc., however, are regarded as a distinct possibility.

There appear to be three avenues of attack on the problem: (1) Improvement of the product that will increase its salability; (2) design changes that will make the product more economical to produce, and (3) more efficient manufacturing.

The second and third of the foregoing items, of course, are related in many of their aspects. Design changes that will make the product cheaper to build often will involve the adoption of constructions that are less expensive to manufacture only because the tool builders have made new and more efficient machinery available. Weight reduction also is a possibility in connection with such design changes, particularly in view of the steady and, in some instances, rather sharp increases in gross weights in recent years. This upward trend in weight in response to the demand for bigger, livelier and structurally more rigid cars, is a major reason why car prices are not lower. Although some 1935 models may be lighter, a general reduction in car weights appears improbable since many executives are of the opinion that next year's cars will weigh about the same as this year's. Consequently, that weight savings will provide a major basis for lower prices appears doubtful.

#### More Efficient Equipment

More efficient manufacturing comprehends not only improved procedure in the factory, but also taking full advantage of the huge strides the machine tool makers have made during the depression. The \$4,500,000 Fisher body is spending on production facilities, as reported elsewhere in this issue, is per-



#### The Millionth Plymouth

Walter P. Chrysler celebrating the building of his millionth Plymouth by driving the car from the production line himself. Mr. Chrysler is shown at the wheel of the car. Standing beside him is B. E. Hutchinson, chairman of the board of Plymouth

haps an early indication of development along this line.

There is no dodging the fact that Mr. Sloan's announcement and Mr. Ford's earlier statement have serious implications for the industry as a whole. At present price levels, only General Motors and Chrysler have reported substantial profits for the first half and even their profit margins are materially under those obtained last year on less volume. Lacking any official report, how Ford fared in the first half can only be conjectured, but, in view of the volume he enjoyed, there is no reason to doubt that he was comfortably in the black. Of the remaining car companies which have reported for the first half, Hupp, Reo, Packard, Hudson, Nash and Auburn all show losses with Graham reporting a net income of \$20,000.

#### Difficulties Intensified

If prices are to go lower, the difficulties confronting these companies obviously will be intensified, unless the lower prices result in a more than balancing upswing in volume. Moreover, the three avenues mentioned previously by which more attractive products at lower prices might be achieved, all call for the expenditures of substantial sums of money which would put the already limited liquid resources of some of the independents to a severe test. Much the same problem faces the parts makers as they presumably will be called upon to do their part. In this connection, it is being pointed out that the equipment suppliers on the whole have fared better this year in the matter of profits than have the car makers.

That Mr. Sloan believes that the recovery program has tended not to increase purchasing power but rather to

decrease it, seems to be clearly indicated by his statement: "Hours have been shortened; wages have been raised; important increases in the cost of materials have had to be absorbed. Increased costs have resulted not only from the direct influence of higher levels of expense, but through the indirect effect of a lowering in operating efficiency. On the other hand, the economic influence of these national recovery programs on individual purchasing power has, in principle, been to reduce the spread between the real cost of living and real income. That being the case, manifestly, purchasing power is not available to sustain selling prices commensurate with increased operating costs. The question of the profit margin of industry therefore arises, although these adverse influences are partly offset, at least in some instances, by increased turnover."

"This set of circumstances reflect the trend of industry in general, and although unsatisfactory, should not be accepted by industry as a set of conditions under which it must necessarily operate permanently. . . ."

#### Wholesale Automotive Code Budget \$325,000

The Code Authority of the wholesale automotive trade has made application to the National Recovery Administrator for approval of its budget and the basis of contribution to the same by members of the trade, for the maintenance of code administration.

The total amount of the budget, for the period from June 1, 1934, to May 31, 1935, is \$325,000. The basis of contribution is 70 cents per annum per \$1,000 net sales for the year 1933.

## Indianapolis Race Fuel Allowance Cut

**Limit Set at 42½ Gals.  
for 500-Mile Classic;  
Exempt 2-Cycle Engines**

A further reduction in the amount of fuel allowed for the entire 500 mile 1935 race was decided upon here Monday at a meeting of the Indianapolis Motor Speedway Association. The reduction, two and one half gallons, bringing the allowance to 42½ gal., however, is not considered as seriously aggravating the finishing abilities of cars. "Wild Bill" Cummings the winner of the 1934 race used but 35½ gal., although he set a new record for the speedway. The distance covered by Cummings included two additional "safety" laps. Every one of the finishers this year would have been able to meet the 42½ gal. limitation.

An exception is to be made for two-cycle engine cars, and a committee will investigate just what fuel limitation should be placed on vehicles of this type. It is likely that the limitation will be somewhere between 60 and 80 gallons, based on the showing of Leon Duray's two-cycle job this year in preliminary tests.

The purpose of this special ruling is to encourage the development and entry of two-cycle engined vehicles at Indianapolis.

Oil burners also received some additional consideration in that they have been allotted a handicap of five miles per hour in qualification trials to determine starting position. A Diesel-engined car, if it should qualify at 95 m.p.h., thus would be given an official competitive qualification speed of 100 m.p.h. On the other hand, Diesel-engined vehicles will have to take their chance of coming within the top 33 cars to start in the race. This year they were permitted to start irrespective of qualifying speed, providing they attained a qualifying speed of 95 m.p.h.

The question of handicapping racing cars adversely on a weight basis was discussed at the meeting, there being a desire expressed by some, of giving the semi-stock car a better break. At present the racers come close to the 7½-lb. minimum limitation, while the stock cars run somewhat higher.

The question of increasing the minimum to 8½ lb. for the strict racing jobs finally was turned over to a committee for consideration. Any recommendations asked for by Jan. 1, 1935, however, will not affect the 1935 race and will not be incorporated in specifications until blanks are sent out for the 1936 race.

The entry blanks for the 1935 race will show another change, however, and that is the incorporation of a three-gallon limitation for qualifying trials—with a ½-pint tolerance.

A new race rule was also adopted limiting the speed of all cars to 75 miles per hour during any period when the caution flag is being displayed. This has been adopted in view of the argument which de-



**E. V. Rickenbacker, president of the Indianapolis Speedway Assn., who presided at the rules committee meeting**

veloped after the 1934 race, Mauri Rose claiming that Cummings, the victor, had picked up distance on him while the yellow flag was out.

Col. E. V. Rickenbacker, president of the Speedway Association, presided at the meeting.

## Automotive Industry Not Affected by Alco Strike

Strikes at some of the Aluminum Company of America plants are not expected to affect automotive production in any way. Neither the Detroit nor the Cleveland foundries are affected, these supplying castings to the automotive industry. Furthermore a virgin metal plant at Badin, N. C., is still operating, and producing ingots.

In addition to this some three years' supply of virgin metal is stocked by the Aluminum Company, although a high percentage of this, apparently is in plants at present picketed. So far, it is understood no attempts have been made to move ingots out of the picketed plant, this not having been necessary.

## "Met" Section Plans Week-End Meeting

Metropolitan Section, S.A.E., is planning a week-end meeting at Spring Lake, N. J., September 7, 8 and 9. The affair is largely a social gathering featuring various sports events and is intended to usher in the coming season's technical activities.

## Original August Estimate of 250,000 Appears Correct As Sales Slacken

**by Athel F. Denham**

*Detroit Editor, Automotive Industries*

Long delayed, the expected drop in retail domestic deliveries of cars and trucks finally made its appearance nationally in the week ending Aug. 11, early reports indicate. On some makes the drop apparently is as much as 20 to 30 per cent under the same figures for this period in July. The average, however, seems to be nearer 15 per cent.

At the same time, a general indication of slackening production appeared with parts producers reducing schedules for deliveries. So far the car factories have not cut schedules in the same proportion, but are operating on a slightly downward basis each week.

It is highly likely that most of the major plants will be closed Labor Day week and reports are current at present that some will close a week earlier and remain closed for two weeks. It would appear, therefore, that August will be the first month this year to show lower production totals for the industry and possibly lower retail deliveries than for the same month last year.

*Automotive Industries* estimate of 225,000 production for August made the beginning of the month seems to look near-

er right at present than the high schedules for the first two weeks would indicate.

Dodge reports sale of 2881 cars and trucks for the week ending Aug. 11, with field stocks stated to be equivalent to five weeks normal demand. Dodge truck shipments the same week passed shipments for entire year 1933.

Plymouth reports retail sales week ending Aug. 11, totaling 7536 compared with 6717 the same week last year. Plymouth production this month is currently estimated at 25,000.

Pontiac's first 10 days sales reports show a decline of only 230 units for the first 10 days of July which, however, included the July 4 holiday week.

DeSoto reports sales week ending Aug. 11 up nine per cent over preceding week with sales for last four weeks 15 per cent better than preceding four weeks. Reduced prices on cleanup models probably account for this showing.

Chevrolet reports that it established a production record in July with 92,947 passenger cars and trucks, the highest July production since July 1929. In the

*(Turn to page 190, please)*

## "Piecing Out" Orders Aid Steel Producers

Institute Puts Activity At 22.3% of Capacity; Demand for Tool Grade

Eleventh-hour orders from moderate tonnages of sheet and strip steel for use in 1934 car models, due to the recent spurt in consumer buying of these, are expected to make a somewhat better showing for finishing mills over the second half of the month than is indicated by the American Iron and Steel Institute's estimate of ingot capacity in operation this week.

The Institute's report, showing only 22.3 per cent of ingot capacity active, as compared with 25.8 per cent last week, denotes the low since March, 1933. With the exception of tin plate demand from packers, none of the steel industry's other outlets shows any signs of furnishing a stop-gap, so that even commitments for relatively light tonnages by parts makers and motor car manufacturers at this time are most welcome.

Middle West finishing mills, especially those in the Michigan and Cleveland districts, with Chicago district mills participating to some extent, have a run of odds and ends of business which enable them at least to keep the wheels turning until buying for new model material gets under way.

What buying emanates from automotive consumers is of such a character as to confirm the impression that, while there was fairly heavy stocking by some at second-quarter prices, others refrained from taking on even one pound more steel than current operations would absorb. A good deal of the present demand consists, therefore, of piecing out. Tool steel sellers continue to receive considerable in the way of die-steel business. The suddenness that marked the last price change in the flat steel market is still fresh in the minds of some consumers, and it is only natural that there will be a certain amount of dilly-dallying in the matter of placing fourth-quarter business.

**Pig Iron**—Very little buying by automotive foundries is in evidence. Code prices are unchanged. A waiting attitude features the market at all ends.

**Aluminum**—According to trustworthy re-



A coal-burning Sentinel steam truck which has been imported into this country by Major F. G. Goddard, director of the Sentinel Wagon Works, England, for demonstration purposes

ports, holdings of ingots by the sole domestic producer exceed 300,000,000 pounds, considerably more than a full year's production in years when demand was running abnormally high, so that the market for virgin metal should be very little affected, even though the strike of workers in the ingot producing plants should become a long drawn out affair. Moreover, imports could easily be resorted to so as to augment the supply. Market prices are entirely unchanged, no effect whatsoever having been felt of the reported walkout of the workers at the different reduction plants.

**Copper**—The "Blue Eagle" price for electrolytic copper remains at 9 cents, delivered Connecticut, with the "outside" market nominally quoted at 8½ cents and upwards.

**Tin**—London cables at the opening of the week reported that the International Tin Committee had decided to order a 20 per cent decrease in production, in consequence of which the price of Straits tin rose almost a full cent per pound, being quoted at 52.90 cents at the market's opening.

**Lead**—Quiet and unchanged.

**Zinc**—Steady.

### Frank D. Heath

Frank D. Heath, Detroit district sales manager of the Jones & Laughlin Steel Corp., died at his home here Saturday after an illness of six weeks. Mr. Heath, who was 54 years old, had been with Jones & Laughlin for 35 years, coming here as district sales manager from Boston in 1915. He was a member of several clubs. Mr. Heath is survived by his widow, Bernice E. and a brother, H. D. Heath of Dorchester, Mass.

### Pyke Johnson to Address ATE Annual Convention

Pyke Johnson, vice-president and Washington representative of the N.A. C.C. and Lloyd Garrison, chairman National Labor Relations Board, will discuss labor relations at the annual convention of the American Trade Association Executives to be held in Washington, September 20-22.

### Nash Nation-Wide Sales Contest On

A sales contest of national proportions, in which Nash-LaFayette salesmen will compete for free trips to the Chicago World's Fair, has been announced by Courtney Johnson, Nash general sales-manager. The contest is being held in conjunction with an intensive sales drive for summer business launched last month.

### Udylite Changes Name

Due to the broadening scope of its activities, the Udylite Process Company has changed its name to The Udylite Company and, in addition, has moved its offices and laboratories to new and larger headquarters at 1651 East Grand Blvd., Detroit.

## Wholesale Exceeds Retail Financing by 26 Per Cent in First Six Months

(282 Identical Companies)

Year and month	Wholesale Financing Volume in Dollars	TOTAL		RETAIL FINANCING						USED CARS			UNCLASSIFIED		
		Number of cars	Volume and Average	Per car	Number of cars	Volume and Average	Per car	Number of cars	Volume and Average	Per car	Number of cars	Volume and Average	Per car	Number of cars	Volume and Average
May, 1934 .....	\$123,691,003	259,120	\$99,591,058	\$384	122,155	67,991,000	\$557	132,072	\$29,763,110	\$225	4,893	\$1,836,948	\$375		
June, 1934 .....	102,706,220	255,450	99,117,286	388	125,525	68,736,722	548	124,949	28,507,961	228	4,976	1,872,603	376		
6 Mos., 1934 .....	\$547,626,676	1,156,078	\$435,724,135	\$377	527,103	\$291,407,561	\$553	605,445	\$135,951,377	\$225	23,530	\$8,365,257	\$356		
June, 1933 .....	56,937,616	185,286	65,514,154	354	84,358	43,004,313	510	96,741	21,181,515	219	4,187	1,328,326	317		
6 Mos., 1933....	\$238,138,619	766,753	\$263,059,421	\$343	321,438	\$163,339,040	\$508	426,923	\$93,950,486	\$220	18,392	\$5,769,895	\$314		

# \$767,768,277 Was 1933 Total of Purchases by Car Makers

Important as the automotive industry is as an employer, it is of vastly greater economic significance as a customer of other industries. This fact is emphasized once again by the data on motor vehicle manufacturing released this week in connection with the Government's biennial census of manufactures.

The salient facts about industry developed by the census are summarized in the accompanying table. In interpreting the data, it should be understood that they cover only motor vehicle manufacturing and assembly plants. Establishments whose principal products are bodies, parts and/or accessories are not included in this table.

Total value of the products of motor vehicle manufacturing and assembly plants last year was \$1,096,946,283, of which \$928,088,137 represented complete vehicles and chassis, while \$168,858,146 consisted of other products, mainly parts and accessories, manufactured in such plants. The 1933 total represents a decline of 31.5 per cent from the previous census total in 1931 and of 70.5 per cent from 1929.

The industry's importance as a customer of other industries is reflected by the figures, which show that of the value of its products last year 70 per cent went for material, fuel and purchased electricity. This compares with 66.6 per cent in 1931 and 64.6 in 1929. These figures provide abundant evidence that as a factor in our national economy, the motor vehicle manufacturer's major role is that of a customer. They suggest, too, that the most important assistance the industry can offer to national recovery is to build and sell more automobiles, and that anything that interferes with the rational attainment of this end is reducing the contribution the industry can make to the restoration of prosperity.

The money which the industry disburses to its suppliers has a much more important effect on national purchasing power than does the wages it pays out directly. Although there are no data indicating what share of the purchases of the automobile manufacturersulti-

mately finds its way into the wage-earner's pay envelope, some conclusions drawn by Paul H. Douglas, professor of economics, University of Chicago, in his recent book, "The Theory of Wages," may give a rough idea. As a result of research, Professor Douglas concludes that "American statistics seem to indicate that during the years 1909-1918 labor received 74 per cent of the total net product" of manufacturing industry.

Obviously, if these estimates even approach approximate correctness, comparison with the payroll figures in the accompanying table indicates that the industry's purchases are a vastly more important index of its contributions to national purchasing power than are the wage payments it makes directly.

Direct wages absorbed 9.5 per cent of the value of the automobile manufacturers' product, as compared with 10 per cent in 1931 and 9.8 in 1929. The 1933 wage total was 33 per cent under 1931 and 71.6 per cent below 1929. These huge drops in wage payments closely parallel the decrease in the value of products.

## Summary of Census Data on Motor Vehicle Makers

	1929	1931	1933
1 Total value of product.....	\$3,709,514,988	\$1,567,526,262	\$1,096,946,283
2 Wages exclusive of salaries.....	364,457,339	156,755,887	103,536,820
3 Cost of materials, fuel and purchased electricity.....	2,394,560,618	1,044,405,902	767,768,277
4 Balance of total value after deduction of wage and material costs = available for salaries, taxes, insurance, depreciation and other overhead costs, as well as interest and dividends..	950,497,031	366,364,473	225,641,186
<b>PER CENT OF TOTAL</b>			
5 Value of Product, Line 1.....	100.0%	100.0%	100.0%
6 Wages, Line 2 .....	9.8	10.0	9.5
7 Material Costs, Line 3 .....	64.6	66.6	70.0
8 Balance, Line 4 .....	25.6	23.4	20.5
9 Number of wage earners exclusive of salaried employees* .....	224,688	134,866	97,594
10 Wages per worker* .....	\$1,620	\$1,160	\$1,060
11 Real wages, line 10 adjusted for cost of living .....	1,620	1,340	1,420
12 Number of establishments .....	210	178	122

\* Includes part-time workers.

He indicates that this ratio held roughly through 1922 but not thereafter.

If it may be assumed on the basis of Professor Douglas' work, and it is recognized that this may not be a proper assumption, that 70 per cent of the purchases of the automobile manufacturers ultimately go into pay envelopes, then such purchases represented roughly the following additions to the national pay-rolls:

s:  
 1933..... \$ 537,000,000  
 1931..... 730,000,000  
 1929..... 1,670,000,000

The average number of wage-earners in 1933 was 28 per cent under 1931 and 57 per cent less than in 1929. The decreases in employment are less than in payroll because of the inclusion of part-time workers in determining the averages.

Earnings per worker were \$1,060 in 1933 as compared with \$1,160 two years ago and \$1,620 in 1929. The inclusion of part-time workers, of course, serves to accentuate the decrease in average earnings. However, when the averages are adjusted for changes in the cost of living, it is found that real wages in 1933 were \$1,420 against \$1,340 in 1931 and \$1,620 in 1929.

The proportion of the value of product available for overhead items, salaries, interest, dividends, etc., has declined steadily since 1929. In that year 25.6 per cent was available for these factors, which compares with 23.4 and 20.5 in 1931 and 1933 respectively.

THIS CHECK IS IN PAYMENT OF THE FOLLOWING	
ITEM	AMOUNT
FOR MATERIALS, FUEL AND ELECTRICITY USED IN 1935 PRODUCTION	\$ 768,000,000.00
<p>Pay to the order of <u>AUTOMOTIVE SUPPLIERS</u></p> <p><u>SEVEN HUNDRED SIXTY EIGHT MILLION and 00/100----- DOLLARS</u></p> <p><i>Motor Vehicle Manufacturers</i></p>	

## Board of Directors Johnson's NRA Aim

### General Again Proposes Revamped Administration

A change in NRA administration and policies appears imminent and reports indicate that this change may come within the next few weeks. General Johnson again has advanced his idea for government of NRA by a board of from three to nine members with the possibility of himself holding the portfolio of chairman. The Administrator put forth this same idea several months ago and at that time announced his desire to retire from public life, adding, however, that he would remain to work with or under the guidance of such a board as he recommends, should President Roosevelt desire his services.

At the same time reports current earlier in the week indicated a possibility of Donald Richberg, former NRA counsel and latterly executive director of the National Emergency and Executive Councils, being named to the post of administrator contingent upon the retirement of the General. Foundation for this possibility came from a call upon Mr. Roosevelt by Mr. Richberg and the subsequent calling of a conference of the aforementioned councils in conjunction with the smaller Industrial Emergency Council. Mr. Richberg is reported to have developed a plan for NRA reorganization which contemplates drawing into closer harmony the NRA, Federal Justice and other governmental agencies, Trade Commission, the Department of allied to industry. This plan, reports indicate, has the support and endorsement of several Cabinet members.

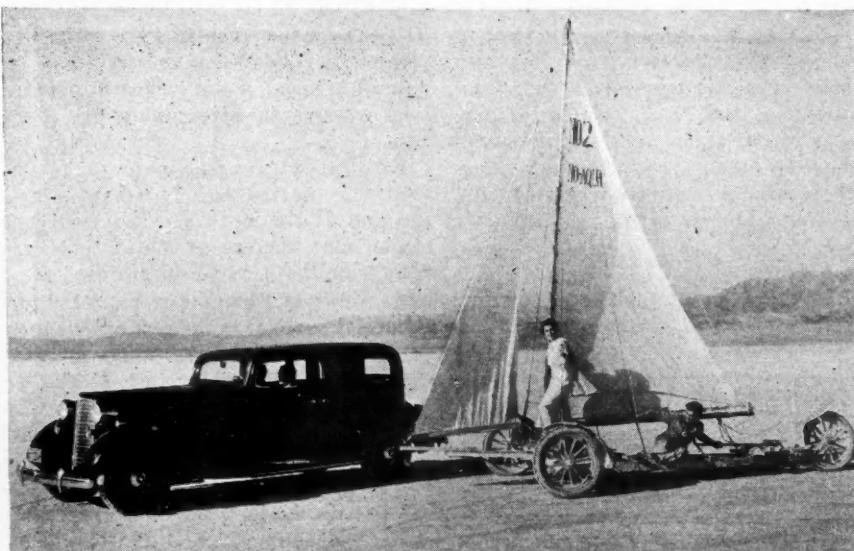
### Fisher Improvements To Cost \$4,000,000

Expenditure of approximately \$3,000,000 for new equipment, additional plant space and rearrangement of all production facilities has been announced by the Fisher Body division of the General Motors Corporation. The expenditure will be distributed over the entire country, although the major portion will be used for rearrangement of facilities in Cleveland, Detroit, and Pontiac.

This expenditure is in addition to recent investments of approximately \$1,500,000 for new press equipment, including purchase of the largest triple action presses ever built, according to Fisher.

At Cleveland some 40,000 square feet of floor space will be added to the Fisher plant. In addition to the expenditures already mentioned some \$1,000,000 will be spent in rearranging production facilities of Fisher plants serving Chevrolet branch assembly units throughout the country. The report does not state whether this includes an expenditure for a new plant in Baltimore to serve the Chevrolet assembly plant to be built in that town.

In announcing his proposal to transfer NRA from a one-man rule to a "board of directors" General Johnson denied any break in cordial relations between himself and Mr. Richberg. He said he and the former NRA counsel had written the law together and have operated in complete harmony under it.



This land yacht is similar in construction to an ice boat except that wheels instead of runners are used. When paced by the Nash Ambassador Eight on the bed of a dry lake at Trona, Calif., it was discovered the craft could travel up to 35 m.p.h.

## Pressed Metal Group Files APEM Appendix

### Five Supplements Ready for Approval; Nine Are Still Pending Before NRA

The pressed metal product group has filed a fair trade supplement to the master APEM code and one is about to be filed by the hydraulic hoist manufacturers. It is understood that no other product group supplements are ready for filing at this time and it is regarded as doubtful that any more supplements will be submitted to NRA. This would make the total of such supplements 19 although at one time it was thought that the number might reach as high a total as 75.

Three supplements—the hot water heater, leaf spring and replacement axle shaft—have been approved and are in effect. Public hearings were held on 14 supplements some weeks ago and of these, four are reported to be ready for approval and one is practically so. The remaining nine are still in the process of negotiation with NRA.

The 14 supplements referred to cover the following product groups: wheel and rim, internal combustion engines, powdered metal bearings, oil filters, radiators, carburetors, gaskets, electric lighting and reflecting devices, spark plugs, piston rings, shop equipment, pistons and piston pins, water pumps, and valves.

### Seek To Clarify Truck Code Budget Provision

The code authority of the trucking industry has submitted for NRA approval a modification which would amend the code by rewriting, for purposes of clarification and conformity, the provisions authorizing the Code Authority to establish a budget and basis of contribution from members for code administration expenses.

Notice has been given that criticisms, objections or suggestions regarding this must be submitted to Deputy Administrator E. E. Hughes, room 3208, Department of Commerce building, Washington, prior to Aug. 23.

### Reynolds Spring Proposes Capital Stock Increase

A special meeting of the Reynolds Spring Co. has been called for September 5 to vote on an increase in authorized common stock from 200,000 to 400,000 shares, and change from no-par value to \$1 par value. Further matters to be considered include the charging of a \$268,803 deficit shown in the balance sheet of June 30, 1934, against paid-in surplus as of December 31, 1933, leaving a balance in surplus of 344,223.

## NLRB Surveys ALB, Industrial Boards

### Will Determine Whether Statutory Powers Shall Be Granted by President

The activities and functions of the various industrial boards, of which the Automotive Labor Board is one, are undergoing careful study and scrutiny by the National Labor Relations Board to determine whether or not these boards as a group, or any one of them individually, should be clothed with statutory powers by the President under the provisions of the Joint Resolution. This study also contemplates the working out by the NLRB the necessary lines of cooperation between itself and the various industrial groups, and in cooperation with NRA the board is making a study of proposals for the creation of additional Industrial Boards and to what extent, if any, special boards should be created by the President to deal with problems of labor controversy within particular industrial groups.

These activities of the NLRB were contained in the first report of the board signed by Lloyd K. Garrison, chairman, and presented to President Roosevelt early this week by Secretary of Labor Perkins. According to the report considerable time will be devoted to handling cases coming before the board involving Section 7a. The board states it does not feel that it can, as a practical matter, act in the capacity of mediator, pointing out that such activity should properly be engaged in at the seat of the controversy. However, it puts itself on record to exert every effort to promote harmonious settlements of all cases coming before it and to reduce to a minimum the number of cases requiring decision and enforcement of Section 7a. The Board says in its report it feels the old National Labor Board, headed by Senator Robert Wagner, established a number of principles in interpretation of this section of N.I.R.A. which are "so clear that they require no further discussion," but that these principles must "be constantly applied to new situations in which the fact may be either in dispute or so

## As We Go to Press

Possibilities of a fall revival of automotive business is indicated with plans being drawn by many of the major builders for extensive fall sales campaigns with heavy newspaper, radio and magazine advertising schedules.

\* \* \*

Attacks on the Detroit Regional Labor Board were launched this week by the M.E.S.A. with complaints of bias sent to Lloyd K. Garrison, head of the new Labor Board in Washington.

\* \* \*

The maintenance code may end up as a supplement to the motor vehicle retail code which would be in line with NRA's policy of reducing the number of codes. Maintenance men would have their own administrative agency and would be subject to the same labor provisions and fair trade practices as the dealers. The proposition is reported to be acceptable to the car dealers if the maintenance trade will go along.

\* \* \*

Up to Thursday morning no further major changes have taken place in the union labor situation in the Detroit area. So far there has been no indication from American Federation of Labor headquarters that any action would be taken on the request of the Detroit Federation to remove William Collins, national automotive organizer.

\* \* \*

Packard is having a large dealer and distributor meeting here Aug. 30 and 31 at which it is reported that forthcoming new models will be shown.

\* \* \*

Commander Wilfred Briggs died Wednesday in Tucson, Ariz. Commander Briggs, who has been closely identified with GM's development work on streamlining on the staff of O. E. Hunt where he was in charge of special engineering investigations, was an internationally known figure, having for one thing, devised the British aircraft defense system for London during the war. He was about 45 years old and is survived by his son.

different in texture from any preceding situation as to leave room for doubt or argument."

In order to dispatch its business with promptness the board plans to decentralize its authority by setting up the Regional Labor Boards and staffing them in such manner that they will be equipped to "hear cases without delay and make such adequate records of the proceedings that if any compliance with its recommendations does not follow, the cases may be immediately heard and disposed of by our Board without the necessity of taking further testimony."

The National Labor Relations Board is empowered to confer upon the regional groups the statutory powers of calling elections of employees and to

subpnea payrolls in labor disputes. However, the NLRB states in its report it does not believe it wise to use this power until it is satisfied the Regional Labor Board's machinery for carrying on such work has been perfected and the NLRB has gained sufficient experience in exercising its own statutory powers.

## MEMA Adds 18 New Members to Roster

Eighteen manufacturers of automotive products recently have become affiliated with the Motor and Equipment Manufacturers Association.

Following are the 18 newest additions, which with the 25 previously announced, bring the total to 43: Automotive Products Co., Cleveland, Ohio; Accurate Parts Mfg. Co., Cleveland, Ohio; Baldor Electric Co., St. Louis, Mo.; Bishop & Babcock Mfg. Co., Cleveland, Ohio; Columbian Vise & Mfg. Co., Cleveland, Ohio; Dayton Rubber Mfg. Co., Dayton, Ohio; Dill Mfg. Co., Cleveland, Ohio; Electric Heat Control Co., Cleveland, Ohio; Gatke Corp., Chicago, Ill.; Hoover Steel Ball Co., Ann Arbor, Mich.; Harley Soap Co., Philadelphia, Pa.; Hyvis Oils, Inc., Warren, Pa.; K-D Lamp Co., Cincinnati, Ohio; Murphy Varnish Co., Newark, N. J.; Packard Electric Div. of General Motors Corp., Warren, Ohio; Perfex Radiator Co., Milwaukee, Wis.; A. Schrader's Son, Inc., Brooklyn, N. Y.; C. Spiro Mfg. Co., Dobbs Ferry, N. Y.

## Six Months' Earnings

Vehicle Companies	1934	1933
14 Companies Reported	+\$65,194,069	+\$40,903,657
Total—14 Companies	+\$65,194,069	+\$40,903,657
Other Automotive Companies	1934	1933
29 Companies Reported	+\$9,629,407	+\$1,070,801
Alemite Die Casting	— 27,124	— 27,256
Continental Diamond Fibre	— 59,985	— 106,440
Thompson Products	— 421,795	— 144,018
Aluminum Industries	— 68,728	— 62,291
McQuay-Norris Co.	— 200,511	— 211,690
Murray Corp.	— 280,771	— 477,346
Tung-Sol Lamp	— 163,872	— 18,749
Motor Wheel	— 608,901	— 115,092
Total—37 Companies	+\$11,292,876	— \$1,130,003

## Show Arrangements OK Expected Monday

Full Committee Meeting Scheduled; Space Choice Based On US Production

The first full meeting of the Show Committee of the Automobile Merchants Association of New York, Inc., has been set for Monday, Aug. 20, at which time will be confirmed certain tentative arrangements made for the New York Automobile Show in January.

Owing to the fact that the full committee has not met previously, no official statement is available as to the plans for the Show, but it becomes increasingly evident from various sources that so far as the public is concerned the forthcoming Show will not be different from those held in the past, with the possible exception of participation by local Ford interests.

It was expected that a lease for Grand Central Palace would be signed on Thursday, Aug. 16, and that physical management of the exhibits would remain with the same men who functioned under the late S. A. Miles. Alfred Reeves, general manager of the National Automobile Chamber of Commerce, who has acted as show manager for the national shows during the past two years, is expected to sit in on all the deliberations of the dealers' committee.

### "Let the Punishment Fit the Crime"

In a curious moment the NAFC propounded an academic question—"Is horse stealing a more serious crime than automobile stealing?"—and then set about getting the answer.

The majority of states make the theft of either a horse or automobile a misdemeanor if the value is nominal, from \$25 to \$50, but the act is a felony if the value of either exceeds these amounts. Down in Louisiana, where a horse is still a horse and an automobile merely a machine, the horse thief is a felon, but the chap who risks his neck taking a car doesn't qualify for select society, it's only a misdemeanor.

Eighteen states impose more severe penalties on horse thieves than on automobile snatchers; 12 states reverse the procedure. There is an enormous range in severity of penalties in the various states, ranging from one year in jail and/or a fine up to \$500 for stealing horses, to not more than three years' imprisonment and/or a fine up to \$1,000 for stealing automobiles.

Choice of space at the shows will be based on national productions of the cars involved. The question of foreign participation is being considered, but remains open at present.

William L. Colt, Dodge Motors, New York, Inc., is chairman of the show committee, and it is understood that G. Harry Bragg, manager of the Automobile Merchants Association will have an active part in the arrangements.



John Graham, formerly president of the Holbrook and Weymann companies, who has joined Duesenberg, Inc.

### Cochrane on Ford Program

"Mickey" Cochrane, manager of Detroit's American League Tigers, went on the air over a nation-wide Columbia chain hook-up, under the sponsorship of the Ford Dealers of America last Wednesday. Cochrane's Wednesday night broadcast, a discussion of the pennant race in both major leagues, was the first of seven weekly programs. The succeeding programs are scheduled for Wednesday evenings from 8 to 8.15 o'clock.

### 250,000 in August

(Continued from page 185)

last four full working days of July 16,901 units came off the line with a record of 4953 in a single day.

Hupmobile shipments during July not only showed a gain over the previous month by a substantial margin but exceeded the July 1933 total by more than 70 per cent.

Domestic retail sales of Buick during July ran to 7949 units. July also was one of Buick's best export months with a total of 1129 units.

Oldsmobile retail sales for July were 131 per cent ahead of the same month one year ago.

Cadillac-LaSalle deliveries, including domestic and export, show a gain for

### Chevrolet Leads Ford In July Registrations

July returns of new passenger car registrations from 22 states show a total of 68,885 as against 51,159 a year ago for the same 22 states. This indicates an approximate increase over July, 1933, of 35 per cent.

Returns from these states show Chevrolet in the lead with 22,028 as compared with 17,627 last year, a gain of about 25 per cent; Ford is second with 19,197 as against 10,767 a year ago, an increase of 78 per cent for comparative states during July, 1933; Plymouth is third with 11,417 units as compared with 8,807 in the same period last year, a gain of 30 per cent.

New truck registrations amounted to 10,360 as compared with 8830 a year ago for the first 17 states for which there are returns. These registrations show an increase of about 17 per cent over comparative states during July, 1933.

the seven months ending July 31 or 78 per cent over the same period in 1933. Cadillacs and LaSalles shipped abroad during the first seven months of this year exceed last year's export shipments for the same period by 783 cars. The export shipments in July showed an increase of 150 per cent over the figures of July 1933.

### Tire, Battery Group Asks Exemption from NRA Rule

Deputy Administrator E. D. Bransome has announced a public hearing, on Tuesday, August 21, on a request by the Code Authority of the retail rubber tire and battery trade for termination of the exemption granted under Paragraph 3, of Administrative Order X-36. The hearing will be conducted in Room D, the Washington Hotel.

The paragraph referred to exempts a member of any industry or trade from the necessity of contributing to the support of any code except that under which its principal line of business is carried on.

### Borg-Warner Launches New Drive for Sales

A new sales drive has been launched by the Borg Warner Service Parts Company following a three-day meeting in Chicago with sales executives.

Thirteen Borg-Warner salesmen representing all territory exclusive of the Pacific Coast district attended the meeting which was presided over by A. C. Darling, general manager, and W. P. Salter, sales manager.

# GM Employees Received \$44,000,000 Benefits From Savings Fund In 1932

During 1932, the depth of the depression when employment and payrolls were at their lowest ebb, more than \$44,000,000 was distributed to General Motors' employees from the General Motors Employees' Savings and Investment Fund Plan, according to statements recently released by the corporation. Today more than 50,000 employees of GM are participating in the plan, which since its inception in 1919 up to December 31, 1933, has had a paid-in total of \$137,074,985 by the workers.

To the employees' savings there had been added \$92,875,297 through interest and operation of the Investment Fund and to this total had been added another contribution, that of the corporation's, equaling 35 per cent of the net deposit. During this same period there was disbursed among the employees \$190,182,263 in cash and securities.

In essence the fund has acted as a practical form of unemployment insurance in the days during the last five years when jobs and wages were scarce and dwindling. On January 1, 1930, according to the GM statement contained in a pamphlet under the title of "A Rainy Day," the employees had reserves in the fund of \$90,000,000. Heavy withdrawals were made during the years of '30, '31 and '32, yet at the end of 1932, due to continued payments by both employees and the company the reserves were \$60,000,000 after the \$44,000,000 distribution.

Any GM employee who has had three months' continuous service with the corporation or any of its subsidiaries in this country and whose rate of pay is not more than \$4,500 per year is eligible to become a contributor. Employees authorize the deduction from their wages or salaries for payment into the fund in amounts of \$5 or multiples of \$5 per month. However, payments may not exceed more than 10 per cent of the wage or salary received, and in no case exceed \$300 per year in any one individual year. Interest at the rate of 5 per cent per annum is paid on deposits and to the net deposit is added the 35 per cent contribution of the company. The money thus paid in by GM is invested in common stock of the corporation, as is the income therefrom during the life of a class and accrues to the benefit of the employees.

## NSPA Announces Third Contest for Salesmen

National Standard Parts Association announces its third annual contest for jobbers' and manufacturers' salesmen, in connection with the annual Salesmen's Conference which the N.S.P.A. will sponsor again this year at the time of the Automotive Service Industries Show in Cleveland.

Prizes will be awarded the employees of N.S.P.A. member concerns for the four best papers on a series of assigned subjects, these papers to be read by their writers at the Conference.

Subjects on which papers of 15-minute reading length will be accepted in the Contest are: "How I Help My Jobbers' Salesmen," by a manufacturer's representative; "If I Were Selling for a Wholesaler," by a manufacturer's representative; "How I Actually Assisted My Maintenance Customers to Successfully Merchandise During the Past Year," by a jobber's salesman or sales manager; "Successful Methods I Used to Sell My Firm's Services and Merchandise as Against Those of Other Distribution Channels," by a jobber's salesman or sales manager.

## So. Africans Would Make Motor Fuels from Corn

The introduction of legislation enabling the production of motor fuel from corn and other vegetable products and that the government should accord protection through customs tariffs to local manufacturing industries are being sought by the corn growers of the Union of South Africa as a means out of their economic dilemma and a measure of protection against crop shortages and surpluses which are one of the country's serious problems according to dispatches received by the Department of Com-

merce from acting Commercial Attaché E. B. Lawson in Johannesburg.

Corn growers are of the opinion that the introduction of such enabling legislation and the protection afforded by customs tariffs to producers of starch, glucose and similar materials would enable them, while paying higher prices for raw materials, to compete successfully with the imported article.

## Duryeas Mark Golden Wedding Anniversary

Mr. and Mrs. Charles E. Duryea celebrated their golden wedding anniversary last Monday with a special service at the Tioga Methodist Episcopal Church in Philadelphia. Mr. Duryea, pioneer of the automobile industry in this country, built his first car, a buggy type propelled by a gasoline engine, in 1891 and 1892.

The first car was destroyed by fire, but a second car built by Mr. Duryea on lines similar to the first is preserved in the National Museum in Washington. Mr. Duryea won the first road race for motor vehicles held in this country. It was the *Times-Herald* race which was run off in Chicago in 1895.

## White Co. Stockholders Receive 31¢ Per Share

A report has been received by the New York Stock Exchange that pursuant to an order of the Court of Common Pleas of Cuyahoga County, Ohio, White Motor Co. stockholders, other than the Studebaker Corp., of record July 23 have received a distribution of 31 cents per share on 30,558 shares. The payment was made on the capital stock.



Battery of five Hutto machines shipped early this year for installation in the new Citroen Javel Works in Paris, by the Hutto Engineering Co., Inc., Detroit, Mich. These machines equipped with Hutto hones featuring a method of synchronized rotation and reciprocation speeds are being used to finish hydraulic brake master cylinders for 7, 8, 10, and 15 hp. Citroens.

# Business in Brief

## Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

General business activity last week was relatively favorable, despite the fact that a large part of the agricultural districts is suffering the worst drought in the country's history, that labor difficulties still exist, and that the foreign situation remains uncertain. There were declines in some lines of industrial activity, but upturns were recorded in several branches. Bituminous coal production advanced sharply, and lumber orders showed an improvement. Wholesale and retail business continued to register gains.

### More Freight Moving

Railway freight loadings during the week ended August 4 amounted to 611,298 cars, which marks an increase of 2,450 cars above those during the preceding week, a decrease of 9,184 cars below those a year ago, and an increase of 114,672 cars above those two years ago.

### Current Consumption Steady

Production of electricity by the electric light and power industry in the United States during the week ended August 4 was below that during the preceding week but 0.5 per cent above that a year ago.

### Crude Oil Off

Average daily crude oil production for the week ended August 4 amounted to 2,451,300 barrels, as

against 2,547,350 barrels for the preceding week and 2,679,200 barrels for a year ago. The current level exceeds the Federal allowable figure by 2,000 barrels.

### Bituminous Output Up

Production of bituminous coal during the week ended July 28 amounted to 6,020,000 tons, as compared with 5,845,000 tons during the preceding week and 7,550,000 tons a year ago.

### Wheat, Corn Subnormal

Latest government estimates place the yields of many important crops far below earlier expectations. The condition of spring wheat on August 1 was only 30.4 per cent. of normal. The corn output is estimated at 1,607,000,000 bushels, as against 2,330,237,000 bushels harvested last year.

### Fisher's Index

Professor Fisher's index of wholesale commodity prices during the week ended August 11 stood at 77.8, as against 77.9 the week before and 77.8 two weeks before.

### Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended August 8 showed no changes in holdings of discounted bills, of bills bought in the open market, and of government securities.

### Battery & Fire Apparatus Code Authorities Get OK

NRA has announced its approval of the personnel of code authorities for the electric storage and wet primary battery industry, and the motor fire apparatus manufacturing industry.

Members of each code authority follow:

Electric storage and wet primary battery industry—E. D. Martin, chairman, Thomas A. Edison, Inc., Kearny, N. J.; C. O. Wanvig, Globe-Union Mfg. Co., Milwaukee; R. D. Mowry, Universal Battery Co., Chicago; A. A. MacLean, U. S. L. Battery Corp., Niagara Falls, N. Y.; L. B. F. Baycroft, Electric Storage Battery Co., Philadelphia.

Motor fire apparatus manufacturing

industry—C. B. Rose, American LaFrance & Foamite Corp., New York, N. Y.; G. R. Stephens, Fire Appliance Corp., Buffalo; H. B. Spain, Seagrave Corp., Columbus, Ohio; C. H. Fox, Ahrens-Fox Fire Engine Co., Cincinnati, Ohio; S. O. Cook, Boyer Fire Apparatus Co., Logansport, Ind.

### Ky. Suit Hits Sales Tax Acts as Discriminatory

A suit attacking two acts of the special 1934 General Assembly designed to require collection of the 3 per cent sales tax on trucks and passenger automobiles purchased outside of Kentucky by persons living in Kentucky has been filed in Franklin Circuit Court by R. L. Lunsford and James C. Barton of Covington.

The plaintiffs, suing on behalf of themselves and all other citizens, seek a mandatory injunction to prevent the State Tax Commission from requiring payment of the sales tax on vehicles purchased outside the state, claiming these acts are discriminatory and constitute class legislation. The two acts in question require that when automobiles are purchased outside the state by Kentuckians, the 3 per cent sales tax must be added to the cost when the annual license is obtained.

### Chevrolet Gets North Carolina Chassis Order

Chevrolet reports that it has been awarded the largest order for automotive equipment ever placed by North Carolina, calling for the delivery of 450 bus chassis for use in school districts throughout the state. Chevrolet was the low bidder at \$202,685. At the same joint session of the state division of purchases and the state school commission, at Raleigh, July 27, orders were awarded to various builders for 675 bus bodies, to cost \$235,685. These bodies are to be mounted on Chevrolet chassis and on additional long wheelbase chassis, to be purchased later, mounting 17- and 19-foot bodies.

The federal government recently granted North Carolina \$182,000 for the purchase of transportation units for schools, and the state itself is providing \$420,000.

### J. B. Siegfried

The death of J. B. Siegfried, who recently retired as vice-president and general sales manager of the Motor Wheel Corporation, is reported from his home in Beverly Hills, Cal. Cerebral hemorrhage is given as the cause of death. Mr. Siegfried, who has been connected with the automotive industry since 1909, was 43 years old. He is survived by the widow and one son, J. B., Jr., and a brother, James Siegfried, still associated with the steel division of the Motor Wheel Corporation.

### William M. Purves, Jr.

William M. Purves, Jr., 16-year-old son of William M. Purves, assistant general sales manager, Dodge Brothers Corporation, died in Petoskey, Mich., from injuries received in an automobile accident.

### New Chrysler Picture

The safety features of the Chrysler Airflow cars will be dramatized in a new sound picture entitled, "Safety With a Thrill." Preliminary work on this new presentation is now under way at the studios of Wilding Picture Productions, Inc.

# NACC Brief Opposes "Spotting" Charge Proposal As Unfair and Discriminatory

Describing as "unfair to and discriminatory against the automobile industry," the W. P. Bartell recommendation to the Interstate Commerce Commission that railroads levy an extra charge for "spotting" service, the N.A.C.C. has filed a brief with the Commission citing nine reasons why the recommendation should not be adopted. The brief, signed by eight traffic managers of automobile manufacturing companies, was presented to the I.C.C. by J. S. Marvin of the chamber.

Mr. Bartell, who is director of service for the commission, filed his report early last June as reported in *Automotive Industries* of June 9. In his recommendations Mr. Bartell stated: "spotting service at an industry in excess of service required in making a simple placement or team-track spotting is in excess of the service required by a common carrier under the line haul rate." At that time N.A.C.C. issued a brochure emphasizing the fact that the Bartell findings were based on the theory that interchange tracks constitute an interruption or interference with through service and that a carrier should make a charge when prevented from performing uninterrupted service to the point of loading and unloading.

"Not only have the railroads been receiving and delivering direct from factory sidings," said the N.A.C.C. at that time, "at the line haul rate, but they have been making allowances to industries that perform the spotting service between factory sidings and the interchange tracks."

Discussing its opposition to the recommendation the N.A.C.C. declares that "the railroads' line haul rates have been fixed to include the service of placing cars for loading and unloading" and that "traffic managers of the automobile industry maintained that adoption of the (Bartell) proposal would render present rates unreasonable and make them subject to a demand for readjustment."

According to the N.A.C.C. cost studies of rail operations prove that the expense to the railroads of performing "spotting" service is not unduly burdensome nor was it unanticipated when the line haul rates were fixed. Moreover, says the Chamber, the placing of cars within large plants is of great advantage to the railroads because it simplifies the collection of large volumes of revenue traffic.

Another argument advanced in the N.A.C.C. brief is that it would be unjust to add charges for spotting service when it is a physical impossibility for the railroads themselves to provide spotting facilities for automobile factories.

"The railroads can offer no substitute for it as an alternative to the proposed new additional charge," the brief declares. "It is based on a rate-making practice at the shipper's door and in this respect is one of its greatest needs today."

Other representatives of the industry who signed the brief are: E. N. Hodges, traffic manager, Hupp Motor Car Corporation; J. H. Myler, director of traffic, Chrysler Corporation; F. A. Allen, traffic manager, Hudson Motor Car Company; R. L. Reese, traffic manager, Buick Motor Company; C. R. Charff, traffic director, Chevrolet Motor Company; G. M. Sherman, general traffic manager, Studebaker Corporation; W. H. Lougheed, traffic manager, Graham-Paige

Motors Corporation; and K. A. Moore, assistant traffic manager, National Automobile Chamber of Commerce.

The shipping and receiving of freight at automobile factories represented approximately 365,000 carloads of railroad revenue in 1933, according to N.A.C.C.

## Secretaries' Conference Planned During NSPA Show

Plans are under way for the holding of a conference of secretaries of local and regional groups of automotive wholesalers, to be held on Nov. 21, during the Automotive Service Industries Show in Cleveland, under the sponsorship of the National Standard Parts Association, according to an announcement by H. N. Nigg, secretary of the N.S.P.A. Wholesalers' Division.

"Through the Association's extensive contacts with jobbers throughout the country during the past year," Mr. Nigg said, "we have found considerable increase in the number of local and regional wholesaler groups. Many of these have been formed to carry out activities in connection with the Wholesalers' Code, and a great deal of good has been accomplished through their formation."

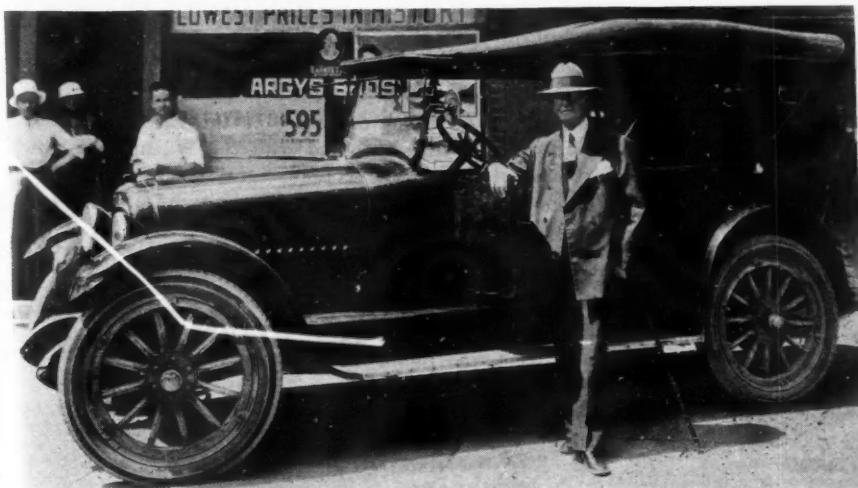
## Two-Way Ignition Switch On Nash Demonstrators

Nash twin-ignition demonstrating models are now equipped with a two-way switch located on the dash which enables the driver to change over instantly from twin ignition to single ignition, and vice versa. Tests are said to have shown that if the car is being driven at 40 m.p.h. on single ignition and the switch is then shifted to the twin-ignition position, the speed of the car is increased by 5 m.p.h. It was also found that on twin ignition the engine can be idled at such low speed and with so lean a mixture that when the switch is changed to the single-ignition position, the engine immediately stalls. These tests, the company asserts, prove the advantages of twin ignition.

## Chevrolet To Reward Mechanics' Proficiency

The Chevrolet Motor Company is about to put in effect a nation-wide plan for awarding special master mechanic badges to skilled and qualified service station employees.

Eligibility to the recognition will depend on character, length of service, and the applicant's proof of superior ability. Each applicant will take two examinations, a month apart, on Chevrolet service methods. Dealers may recommend for the badge only those employees who have worked for three years as an automobile mechanic and at least one year on Chevrolets.



Dr. E. O. Nash, 80 year old Pueblo, Colorado physician, has been officially named the winner of the "Million Car" contest recently conducted by Nash. He is not related to the motor car manufacturer. The seventeen year old veteran shown here has well over 200,000 miles on its speedometer and was the 571st vehicle manufactured by the Nash company. As the winner of the contest Dr. Nash gets the millionth Nash car built.

# The Horizons of

WITH the return of the President, the fall policy of the Administration is translated from speculative anticipation to a definite program. The need for such a program had become imperative while the President was still on the Pacific. Business had declined during the last two months beyond the ability of the Government's cuttlefish statisticians to deny the fact. Security owners had seen the value of their investments drop approximately 7 billion from the spring peak. Commodity prices had languished and labor problems, in the words of old Cy, "were getting no better rapidly."

## Responsibility of Social Control

The boldness with which the Administration upon assuming office had seized the responsibility of raising incomes, improving business, "stabilizing prices," and maintaining security values, effectively precluded a reference to natural forces as the reason for recovery's current failure. The Administration had frankly adopted the principle of social control and could not now evade its responsibility. On behalf of the Government it must be said that it had not lost faith in its power to control economic processes, and was not inclined in the least to dodge the issue.

## Election Psychology

On top of all this the election loomed. In the fall of 1932 more than 39 million citizens cast their choices for President. On both the Republican and Democratic side are voters whose political allegiance is a matter either of strong underlying conviction or family and regional inheritance, neither of which is swayed by the current fluctuations of business. The balance of power at the polls, however, is wielded by a large group of voters who reason by direct and simple association. The farmer who is enabled through Government relief and benefit checks to acquire a new car; the workingman who has a job at \$25 a week for 36 hr. of work instead of the \$20 for 40 hr.; the 1,813,000 men for whom the Administration has provided special relief jobs; the 4,400,000 families for whom Harry Hopkins, the FERA Administrator, is providing; even the business men who have prospered from Government contracts or from the collateral effects of such expenditures will cast a vote for the party in power. It is merely a demonstration of the same psychology which the Republicans for years have exploited in their full dinner pail argument.

## Three Cards on the Table

The point of all this is that the Administration cannot afford to permit any serious slump in recovery if it wishes to remain in office. No occupant of the

White House in recent years has possessed antennae so keenly attuned to popular thought and emotion as Franklin Delano Roosevelt. He has wasted no time in meeting the challenge. Three cards have already been laid on the table. None of them rates as a trump card.

## The Promise of Milk and Honey

1. The strong light of publicity which focuses upon the President has been carefully directed upon the material accomplishments of the New Deal. The most striking of these are the vast power projects at Grand Coulee and Bonneville in the State of Washington, the Seminole in Wyoming, Boulder Dam in the Southwest, and the T.V.A. in the South. An elaborate brochure entitled "Toward an Electrified America," published by another of the Government's alphabetical creatures, portrays the progress and benefits of cheap power in the area of the T.V.A. and particularly in the City of Tupelo, Miss., the first to undertake the distribution of Federal power. Drudgery disappears from the farm, floods are banished, diversified industry attracted at rates to the consumer (1.34 cents per kw.hr. for the domestic householder) substantially below the cost of distribution in such a densely populated and wealthy commonwealth as New York State.

## Nefarious Individualists

2. The second card is slightly soiled, the edges frayed from constant use. The financiers and captains of industry, the symbols of the laissez faire order, are wicked fellows who steal public property, deceive the most innocent consumer, and in general conduct themselves as the earthly minions of Beelzebub. The references to entrepreneurial turpitude contained in the President's western speeches coincided with the Washington release of the second section of the Senate Banking and Currency Committee's report on investment practice. This is the practice which prevailed before the crash in the stock market, now approaching its fifth anniversary. Moreover, it had been eloquently, if not judicially, analyzed by Mr. Pecora and certain Senators from the South and West who found the evidence as revealed by the prosecutor a rich source for safe and suitable political texts.

## Another Shot in the Arm

3. The third card has been forecast by the previous conduct of the Administration. It prescribes a further priming of the pump and provi-

# Business—

by Joseph Stagg Lawrence

sion for relief of the distressed. The first step in this direction is the announcement that all the silver in the country is to be nationalized within a period of 90 days.

There is something curiously baffling to the lay citizen in this monetary hocus pocus which started with the abandonment of the gold standard. From the Treasury come solemn asseverations that the step is not inflationary, that the base of the dollar is in no way cheapened, that the "backing" of precious metals is actually increased, both relatively and absolutely, that it is merely a part of the Government's efforts "to effectuate the policy of the Silver Purchase Act of 1934." Since the Silver Purchase Act specifically limits the price paid for silver to 50 cents an ounce and the order of nationalization provides for a price of 50.01 cents, the precise manner in which the latter is to effectuate the former is less than clear.

## Monetary Coquetry

To make any progress in an examination of the Government's silver policy it is necessary first to take the President's proclamation, the various releases of Mr. Morgenthau, and drop them respectfully in the nearest waste basket. The Government wishes to give business and speculative markets a shot in the arm by flaunting the scarlet promise of inflation, but at the same time wishes to avoid undue alarm to institutions and individuals with money who have hitherto bought the Government's bonds.

Coquetry may be defined as the provocative overtures of a lady who has no intention of yielding this side of the altar. The Government may be compared with this lady who wishes to maintain the interest and hopes of her suitors (business and speculation) who yet does not care to jeopardize her social position (the faith which conservatives have in her monetary rectitude). Thus the silver announcement is merely another manifestation of that monetary coquetry which the Government developed last fall under instructions from Professor Warren and the Committee for the Nation.

It is known that the President in one of his press conferences expressed disappointment with the results of the gold policy. Since silver nationalization indicates a procedure similar to that followed with gold it is possible that the Administration has had a change of heart, that its bag of tricks is running low, that the inflation crowd, in view of the elections, has become tough, that the political repercussions of the business situation are quite desperate, or a combination of these.

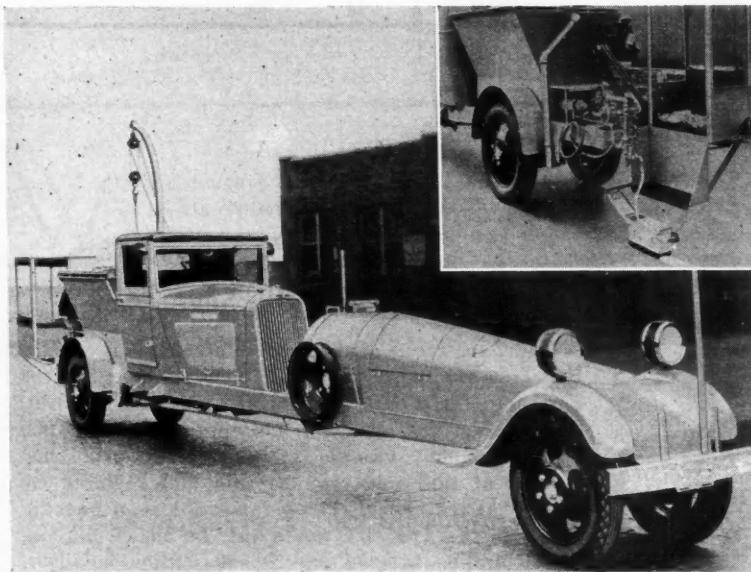
## Compliance With Silver Act

Under the terms of the Silver Purchase Act of 1934 the Treasury must provide a metallic base for the currency—three parts in gold and one part in silver. The Treasury at present holds approximately \$8,000 million in gold. Two general courses are open. One-quarter of this gold may be sold and replaced by silver. At the end of the operation the total metallic stocks in the Treasury would still be \$8,000 million, \$6,000 million in gold and \$2,000 million in silver. On the other hand, the Government may retain all its present gold and purchase an amount of silver equal to one-third of \$8,000 million, i. e., \$2,566 million, making a total metallic base of \$10,666 million. The Government has sold some gold and used the proceeds for the purchase of silver abroad, the largest single transaction being a purchase of 100 million ounces from India. In buying the domestic production of silver at 64.5 cents, the Treasury has paid for it with silver certificates in an amount equal to the purchase price. Since the dollar contains 371.25 grains of pure silver, each ounce of silver if converted into money at its full mint value would be worth \$1.29. Thus the Government makes a profit of 100 per cent on all silver purchased at 64.5 cents an ounce and 158 per cent on all purchased at 50 cents.

## Just a Provocative Gesture

Any net addition which has been made to our currency has come about solely as the result of domestic purchases. It is doubtful if the nationalization of accumulated stocks plus the output of American mines for the first year will exceed 250 million ounces. Assuming an average price of 60 cents an ounce, which is high, Mr. Morgenthau will issue \$150 million of silver certificates in payment. The Treasury will have a free surplus of \$100 million which it may use at some time in the future, just as it will use the much greater profit on gold devaluation. The amount of currency in circulation is determined largely by the convenience of the public. It rises at Christmas time when shopping needs call for cash and declines in the spring. If confidence in our banks is low, deposits are converted into cash and circulation rises. As an element in possible inflation, currency in circulation is infinitely less important in this country than bank deposits. The silver purchase action of the Treasury will prove soothing to Messrs. Thomas and Fletcher, et al., but will have no substantial significance. It is merely a stunning bathing suit which Miss Treasury is trying on.

# Serpent-Like Vehicle Built By Dodge Paints Road, Pours Asphalt and Sand



One of these days you may meet up with a brand-new motor vehicle like the one pictured here, lean, long and narrow, looking unlike anything you ever beheld in your travels over the country's highways.

As you pass the rear of the mysterious craft, you notice that it bristles with machinery and that the mid-section looks like a Dodge truck walking on its hind legs. At the very tail end, you see a little box drawn silently over the road surface, disgorging a yellow line stretching like a gigantic tape into the distance.

Now you begin to sense at least one of the various functions of this new traffic unit. It is a road marker. But it is also designed to pour asphalt on the shoulders of concrete roads and to strew sand over the asphalted strip.

A fleet of machines of this uncommon type have been built for the State of Indiana through the combined facilities of Dodge Brothers Corporation and the White Manufacturing Company of Elkhart. The tread is only 36 inches, but the wheelbase attains the tremendous length of 288 inches.

Under the forward hood that looks like an airplane fuselage are a 20-gallon kerosene tank, the standard Dodge gasoline tank, a tool box and a 75-gallon asphalt tank. Back of the Dodge truck cab is a 165-gallon fuel tank for heating asphalt. At the rear of the frame is a small gasoline engine for driving an asphalt pump, and a compressor for supplying air pressure to kerosene burners and to the tank from which paint is forced to the paint spray box in the extreme rear.

The two masts are sights aiding the driver in maintaining the desired course. The vehicles are said to steer easily despite their great length.

## Issue Official Report on R-5 Tractor Test

Official report No. 224 of the Agricultural Engineering Department of the University of Nebraska has been issued on a test of a Caterpillar R-5 tractor held July 12-20. This is a tracklayer-type tractor with four-cylinder engine of  $5\frac{1}{2}$ -in. bore by  $6\frac{1}{2}$ -in. stroke. The maximum ratings permissible under standard rating codes are 41.24 drawbar

hp. and 54.64 belt hp. Specific fuel consumption at maximum load and at rated load was 0.64 lb. of gasoline per hp.-hr. The weight of the tractor with operator was 13,675 lb. Following are the drawbar pulls, speeds and drawbar horse powers recorded in maximum-load tests in the different gears:

Gear	Drawbar Pull	Speed	Drawbar Hp.
1	10,384	1.77	48.93
2	6,778	2.74	49.44
3	5,049	3.58	48.20
4	3,288	5.11	44.83

## Dealer Prosecuted As Alleged Code Violator

Alleged violation of the Motor Vehicle Retailing Code, particularly the provision prohibiting dealers from giving an allowance on used cars greater than that fixed, resulted in a temporary restraining order being issued against the Northam Motor Co., Lillington, N. C., last Tuesday. The order, according to a report made to NRA, was issued by Judge Isaac M. Meekins of the Federal Court, Eastern District of North Carolina, at Wilmington. The case was handled by United States Attorney James A. Carr and his assistant counsel, L. W. Mather.

This is the second prosecution of the kind in North Carolina and follows a recent indictment in Chicago and successful prosecution under the Code in Ohio and New York.

## Evans Selling for Cummins

Dave Evans, well-known racing driver and more recently trial driver for the Cummins Engine Company of Columbus, Ind., is now engaged as sales engineer with the company and will handle the complete line of Cummins diesel engines for automotive, industrial and marine service.

## CALENDAR OF COMING EVENTS

### SHOWS

American Transit Assoc., Cleveland, Ohio	Sept. 22-27
Cleveland (Automotive Service Industries)	Nov. 19-23
New York Automobile Show	Jan. 5-12
Chicago Automobile Show	Jan. 26-Feb. 2

### CONVENTIONS

American Society for Metals, New York City	Oct. 1-5
American Transit Assoc., Cleveland	Sept. 24-27
International Foundry Congress, Philadelphia	Oct. 22-26
American Foundrymen's Assoc., Philadelphia	Oct. 22-26
National Foreign Trade Council, New York	Oct. 31-Nov. 2

### MEETINGS

American Chemical Society, Cleveland, Ohio	Sept. 10-14
American Welding Society, New York City	Oct. 1-5

### ANNUAL MEETINGS

Natl. Assoc. of Motor Bus Operators, Cleveland	Sept. 21-22
Natl. Safety Council, Cleveland, O.	Oct. 1-5
Institute of Traffic Engineers, Cleveland	Oct. 2-3

### EXPOSITION

Natl. Exposition of Power & Mechanical Engineering (Biennial)	New York, N. Y.	Dec. 3-8
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# JUST AMONG OURSELVES

## NLRB Making Its Rules First

THE new National Labor Relations Board gives every evidence of functioning along lines which are judicially sound and of developing principles for its own operation which can be applied intelligently to all cases. It is exhibiting none of the tendency to rush in and attempt settlement of controversies first and establish its rules of procedure subsequently which too often characterized the work of its predecessor, the Wagner board.

This is particularly important to the parts and accessory industry some of whose difficulties will still get direct National Labor Board attention, since the jurisdiction of the Automobile Labor Board seems to have been extended to cover the parts industry only when called upon by both parties to a controversy.

\* \* \*

## Parts Makers Ponder Future

POSSIBILITIES of further mergers in the passenger car field are causing some very serious thinking about the future these days by parts and accessory manufacturers. If the field narrows much more, many independent parts makers will be independent in name only; they will in reality or to all practical purposes be merely specialty departments of one or two big manufacturers.

Contemplating the problem which faces them, parts executives see several possible courses of action: (a) develop products

and activities in other than automotive fields; (b) stress much more strongly than in the past the truck, bus, marine, industrial, aviation and other allied automotive lines; (c) follow, instead of fight, the current trend and try to sell out to one of the big car building groups; (d) reverse the process and get control of some of the car building groups or start new ones to insure a permanent outlet for products.

Many companies already have moved along the first two lines mentioned, some with greater, some with lesser success.

The idea of parts companies controlling some passenger car manufacturers is not a new one, of course, plans looking toward this end having been started and stopped before reaching the publicity stage more than once in recent years. It involves definite hazards, of course, as well as possible advantages. In some instances it would mean burning existing bridges in the hope of building others of greater permanent stability.

\* \* \*

## Internal Friction vs. External Competition

A MEDIOCRE plan, executed with enthusiasm, efficiency and singleness of purpose results in far greater accomplishment than a brilliant conception whose execution is hampered by divided councils, antagonistic ambitions or bungling operation.

This more or less self-evident truth bears repeating at a time when plans for realignment of forces, programs for new activities and readjustment of man-

agement controls are contemplated in a number of automotive organizations of one kind or another.

This has been a year of definite progress for the automotive industry as a whole. Yet many good companies in various parts of the automotive field have fallen below poor 1933 performances.

Probably more failures result from internal friction than from outside competition. Refusal of an incompetent leader to retire; grasping of various financial or stockholder groups for a maximum share of power in an organization steadily being ruined by the very fact of their grasping; attempts to protect individual personal interests at the expense of the best interests of an operation as a whole—these are just a few of the things that creep in to destroy morale, blunt initiative and dull enthusiasm.

All of which means, probably, that most of us are very human!

\* \* \*

## Not Speed but Stupidity

THE States which have wisely done away with speed limits and placed penalties only on reckless driving, whether the speed be high or low, seem long ago to have agreed with the writer of a recent letter to the Detroit Free Press who observes that the motorist should keep in mind that "It's not the speed but the stupidity."

\* \* \*

DILLINGER read magazines once in a while," writes Gangirl Mary Kinder. "He liked the ones about mechanics and automobiles."

Well, there's one reader lost to some automobile publication. It's a good wind that blows nobody ill!—N.G.S.

# Do Works Councils WORK in

## A critical study of what employee representation plans have accomplished in car and parts factories

by Athel F. Denham

Detroit Editor, *Automotive Industries*

**D**O employee representation plans work in the automotive industry? Surely, after six months to almost a year of operation in some cases it should be possible to give some kind of an unqualified answer. But if you try to phrase that answer the only thing that can readily be said with assurance is that a definite "no" is untenable.

Some of the employee representation plans in the automotive industry, definitely have justified their existence to both management and labor, but again a simple "yes" to the opening question is not a completely satisfying reply. The determinant of course is the measure of success expected from such plans. What is the purpose of a works council and what is it supposed to accomplish? What are its most important functions? On what basis can the operating effectiveness of such an employee association be judged?

### An Outgrowth of 7A

Irrespective of individual company or labor group reasons for the establishment of specific employee representation plans, such councils in the final analysis in general have been a direct outgrowth of the industrial relations requirements set out by that ubiquitous section 7a of the National Industrial Recovery Act, guaranteeing labor the right of collective bargaining with its employers.

Considered primarily with that conception in mind one rather too obvious basis for a critical examination of works councils would seem to be a comparison of the respective histories of employee representation plans and of outside labor unions under the NIRA. When carried through however, an analysis that takes as its premise merely the comparative

achievements of these two types of labor organizations leaves the question unanswered.

Outside labor unions, in the first place, have had but little opportunity at best to show what they themselves could accomplish in this particular industry. To this day professional unions have fought mainly the battles for recognition and membership in the automotive industry. The methods employed form too recent a page in automotive industrial history to require recital here, even if they had a bearing on the question. The point is that these organizations have not reached a position in whatever plan of campaign they are following where they could demonstrate what if anything they could have accomplished along sound and peaceful cooperative bargaining and employee representation lines.

No doubt, professional labor unions would like to and do claim exclusive credit for the increases in wages and shortening of working hours that has characterized automotive industrial plants generally this year. Strikes, both actual and threatened by outside unions probably did contribute toward these ends, especially insofar as they may have accelerated the movement toward high wages and shorter hours. Any claim, however, of complete and sole responsibility for this economic trend does not hold water and, furthermore, claims of objectives achieved must be in turn offset, in cases of actual strikes, by economic losses occasioned to labor out of work.

### Record Shows Superiority

As far as actual achievements are concerned the records comparatively seem to show a vast superiority for the employee representation plan or

"company union," call it what you will. Works councils have definite and exclusive accomplishments to point to. Not isolated cases either, but actually hundreds of instances where requests by labor have been carried out by management.

On what basis are these accomplishments in turn to be judged? Hundreds of them would appear minor in character, ranging from requests for "better washroom facilities in department 412B" to solicitations for "a shade to the window in front of where Alta McCracken works" and "that doors in department 16Q be kept closed during cold weather," etc., etc.

Taken individually, requests of this character by labor do not offer, of course, any proof of validity for a contention that employee representation plans do work. At least they hardly seem to come within the scope of section 7a if that were to be taken as the criterion for judging the relative effectiveness of works councils from the point of view of labor.

### Little Problems Important

On the other hand, such minor requests, taken in the aggregate, even if only for one industrial plant among the dozens which have instituted works councils, of themselves total up to an entirely different conception of the possibilities inherent in employee representation plans. It is from these little things, moreover, that big troubles often start. They create employee dissatisfaction and make the workmen ripe for agitation.

Still forgetting for the moment the more important specific achievements in improved labor conditions credited to works councils, it is already inconceivable that any outside labor union could duplicate that performance. History as far as we happen to know, cannot point to any professional organization in the automotive industry, at least, which, even if it had had the facilities to do so, would assume sponsorship for such highly individualized worker's problems—unimportant from a collective viewpoint, but vital in many respects to the few concerned.

Let us take but one summary. In the plants of a prominent com-

# in the Automotive Industry?

pany in this industry, labor presented through the works council over a period of six months some 630 requests. Of these only 129 could be said to be even remotely connected with the question of compensation, including actual wages, questions of base rates, questions of bonus systems, etc. On the other hand 501 items dealt with such problems as working conditions, welfare, safety and accident prevention, personnel policies, health and sanitation, recreational activities, educational questions, commissary and cafeteria suggestions, plant economy and efficiency suggestions, and discounts to employees. Of these better than 40 per cent dealt with working conditions pure and simple.

The condition is typical of the industry. As a matter of fact, in most cases, the preponderance of requests dealing with matters other than wages or hours is even greater. Let's look a little bit farther. Of the 204 working condition requests or suggestions in the plants mentioned, some 88 per cent were found immediately by management to have merit and were adjusted. Only four per cent were turned down, while the remaining eight per cent were under consideration before adjudication. These latter were all of recent origin.

## Welfare Work

Under "welfare" in these plants can be classified some 69 requests dealing, for instance, with such problems as temporary loans in times of distress; coal purchases on credit at reduced prices; advice and assistance on land contracts, mortgages, garnishments, and attachments, etc. Of course many additional items never reached the works council, but of those that did only one was considered by management as not requiring any action and better than 80 per cent were taken care of immediately without further consideration.

The contention might be raised that a normal "welfare association" could take care of such conditions without requiring a works council set-up as an intermediary. An analysis of the requests, however, indicates that in too many of the more



No employee representation can work effectively unless everyone down the line in management is willing to cooperate. Foremen training along these lines is an absolute essential and is recognized as such by a number of the more important corporations. Here are shown a group of foremen at the Olds plant receiving instructions on personnel relations of all types

important cases, collective considerations and negotiations with management are involved. In the particular case being analyzed there were, for instance, four separate requests for the establishment of a mutual welfare fund to which both labor and management would contribute a like amount. At the last check-up management seemed favorably inclined to cooperate with labor on this vital request.

The percentages might vary slightly one way or the other for other classifications of requests by labor, but in every group the far greater majority were considered as sufficiently justified by management to call for immediate favorable action thereon.

## Requests Reaching Council

It must be remembered moreover that only such requests by employees as could not be solved by direct relations between foreman, superintendent and worker, etc., reached the works council. Literally thousands such cases could be added to the list. The rapidity of their disposal by direct contact without works council intermediary is enhanced by the cooperative spirit engendered by the successful functioning of a works council. Moreover it can be said that the fewer requests reach the works council the more satisfactorily management is performing its function

in taking care of its workingmen's working problems.

That is for one organization. The story however is duplicated, as shown by a review of detail histories of other works councils, in at least a dozen other automotive plants. Claims of major achievements are there, too. In one parts plant for, instance, aside from some hundred and fifty to two hundred issues handled by the employee representatives in cooperation with management and dealing with relatively minor problems, the works council claims to have been responsible for such important achievements as:

1. An increase in the base rate of pay for all employees
2. Simplification of the bonus calculations making it easier for the operator to figure his earnings, as a check
3. A guarantee of a larger percentage of earnings rate
4. An actual increase of 10 per cent in the total earnings rate.

## Crediting Accomplishments

Of course it might be argued that these improvements in wage conditions or some of them can not definitely be classified as accomplishments of works councils, without knowing the complete history down to the last detail of all the contributing factors involved. The improvements might have come about with-



Employees' committee of the AC Spark Plug Employees Association in regular weekly session with Laurence Goodrick, chairman presiding. At his left is Hazel Bailey, secretary. Women employees constitute a high percentage of AC workers and figure prominently in discussions

out the intervention of employee representatives in a plant where management had the welfare of its workers sincerely at heart. Outside labor unions may also have contributed at least psychologically.

### Employee Plans a Factor

Nevertheless employee representatives did have a hand in the major results achieved at this particular plant. This can be accepted as evidence tending to show that a spirit of cooperation can exist and that harmonious discussion can take place between management and employee representatives on broad questions with a hope that both sides will come out of the conferences with a feeling that something definite has been accomplished.

It would be too much to say, however, that it proves that the establishment of a works council plan is in itself sufficient to guarantee labor its legalized right of "collective bargaining," as set forth in Section 7a, whatever "collective bargaining" may mean.

The lack of a proper definition for this term in the minds of labor and management alike is probably the biggest stumbling block in the way of permitting a sound estimate of the value of works councils under Section 7a, on a basis comparative with the achievements or potentialities of professional unions.

Whether employee representation plans work or not then becomes a matter of their intrinsic value to employer and employee alike. Employee representation plans established solely with the idea in mind of preventing professional unions from getting a foothold in a given plant are doomed to failure. History in this industry has once more shown that unless there is a sincere desire

on the part of management to give labor a voice in all matters which concern labor either individually or collectively, employee representation plans had better not be established.

Where management has set up works councils with the idea of only kidding its employees into believing they had a voice, workers have not been slow to learn what lay behind the move. The result has been almost invariably sad. In many cases it has reacted directly against management by first destroying what confidence labor had in the sincerity of executives, and secondly by driving workers into joining professional organizations—the very thing the works council might originally have been set up to prevent.

It is more than just possible that many automotive workers would never have joined a professional union if they had not been taught the mechanical rudiments of collective bargaining by the circulation of working details of mock works councils by management itself. Having been educated to the possibilities of collective bargaining by management, workers have turned to professional unions as the apparently only really effective means as far as they could see, of putting "collective bargaining" into execution.

### Hand Picked Buffers

That applies, of course, only to those companies where sincerity of purpose has not been the guiding factor behind the setting up of a plan for "employee representation." There have been a few of these and they haven't lived except perhaps in name. "Representatives" of workers in some of these plants can hardly be said to have been elected by labor itself. Hand picked by executives their function was not to represent

but to act as buffers between themselves and the workers in the plant.

Further, hand-picking of representatives on the somewhat less crude basis of laying down endless restrictions on who could or could not act as a representative of groups of workers has also been in evidence in a few cases. Careful phrasing of constitutions of employee associations sometimes has made it appear that employees were free to choose their own representatives. But by such simple methods as departmental transfer of employee representatives, etc., management was still left a veto control on the nominations resulting from actual or fictitious elections.

Management has learned—and rather expensively from good-will considerations—that labor has not been slow to discover the legal loopholes for management in these carefully worded documents. In some plants management has had a hard time of it as a result to recreate goodwill by turning over a new leaf in an attempt to give finally to employees a workable representation plan. In some cases employees have taken the matter in their own hands.

### Revisions in Plan

One of the first things that had to be changed in some plans was a provision that no changes could be made in the plan without the consent of management. Elimination of this phrase and all it portends might have been offered in many cases to employees by management before the question actually came up in that particular plant. The move toward its elimination, however, originally came from labor—and what is more important it came about as the result of the capital which professional unions made of that provision in their own battle for membership in automotive plants.

Many companies have made mistakes in the automotive industry along employee representation lines, but in the final analysis the mistakes were not so much a matter of wording of plans or the setting up of certain provisions as they were mistakes in attitude.

Almost any employee representation plan could be made workable, history so far seems to indicate. The plan itself is merely incidental to the purpose. Today there is much that is not common to all working plans. In some companies management representatives sit in with employee representatives during discussions of problems. At other plants they specifically do not. Opinion as to which method is better is about evenly divided.

Absence of company representatives may be considered conducive to freer speech by employees and more ready formulation of proposals. In the early days of existence of a works council this undoubtedly has been true. Again, however, the attitude of the company representative is what counts. If he is helpful and diplomatic—if he is able to draw out employees and make them feel free to express themselves, more can be gained by this form of "collective" discussion, than by independent sessions and subsequent formal presentation of petitions to management again for independent consideration.

It's a pretty big "if" of course, for he must not only have the necessary personal attributes but also the confidence of his management as well as that of labor.

### Divergent Tendencies

At the present time there seem to be two divergent tendencies regarding the mechanics of employee representation plans in this industry. One group is heading toward more direct employer-labor contacts, a more continuous physical interchange of ideas of both a general and a specific nature. This group is probably gravitating toward less and less "collective bargaining" as the term is more generally understood and as it is interpreted by labor organization men. It is anybody's opinion whether or not such organizations in the final accounting may be able to show greater achievements for their memberships by virtue of an increasingly cooperative attitude on the part of labor than the second type.

This second group has developed a tendency away from the theoretical conception of cooperative employee representation in management and is heading in its mechanical set-up more toward the general form followed by professional unionism.

Some of these works councils already have offices outside of the plants from which they draw their membership. Some of them already retain legal talent for the proper

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formulation of demands to be presented to management. Such steps might be regarded on the one hand by some people as a vindication of the mechanics even if not of the modus operandi of professional unionism. Again they may reflect a real sincerity of purpose on the part of management — representing a means to convince labor that their works councils are truly their own without company domination.

### At Opposite Poles?

Such steps may be fully justified on the basis that labor tends to believe that labor and management are at opposite poles, that the no-man's-land which lies between can be bridged only by formal negotiations and by either willing or unwilling concessions from management alone.

Perhaps the conception is correct, much as sincere industrial relations men believe and are trying to convince labor otherwise. Employee organization in the automotive industry is too new a subject to warrant drawing of a definite conclusion at this time. Only experience can dictate which of the two general principles of employer-employee relations is the sounder, particularly when the divergent executive personalities in different companies are also considered.

Works councils of either type however, open up new avenues for closer relationships within industrial organizations. Both can be effectively worked out—much has already been done along that line—if there is a

willingness on both sides to cooperate. The mechanics really aren't important. THE FINAL OBJECTIVE IS THE ONLY VITAL QUESTION.

In one respect, we might add, employee representation plans have already shown a material superiority to those labor organizations which call on professional union men for the actual job of representing workmen. That superiority comes about as the result of the obvious advantage of setting up departmental representatives. Representing as they do only a few hundred employees each, at the most, they are more intimately acquainted with the individual problems of the men in their shop. They are concerned only with the problems of their 'constituents' individually and collectively, and are able to do a better job for them.

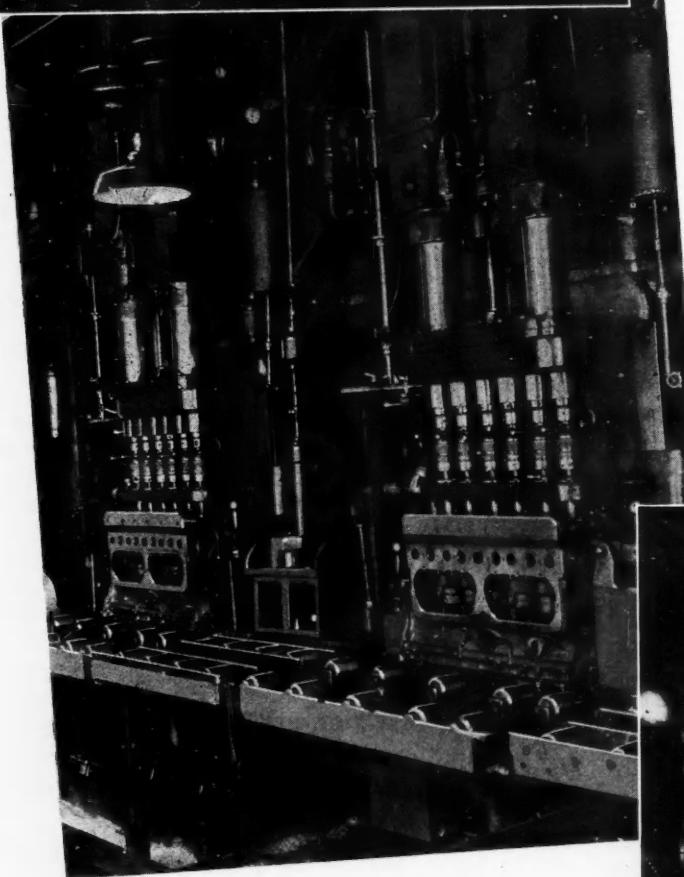
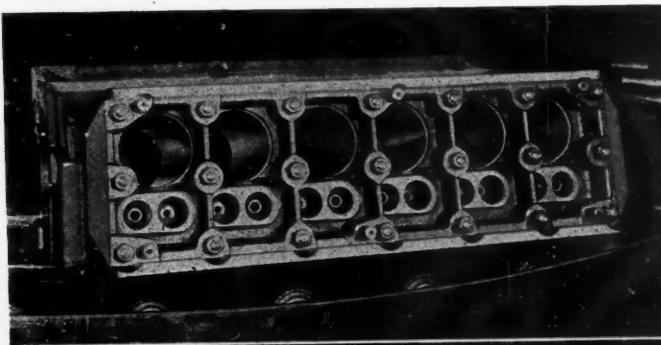
### Action on Broad Questions

Offsetting this advantage which but rarely accrues to professional union locals is the difficulty of concerted action on the part of all employees on questions which concern an entire industrial organization. So far but few requests have come out of such works councils on such subjects as general wage increase, general shortening of hours, etc. What has been done along these lines has been done by departments, not by industrial organizations as a whole. This may be a point of weakness in the cooperative-session type of works council, or may be a point of strength in preventing unnecessary and precipitate action.

Professional unionism trades on mass psychology. A strike is its strongest weapon. Membership in professional unions is difficult to maintain when everything is peaceful and no closed-shop contract exists. Works councils are basically more successful when things are quiet. If matters come to a point where a strike seems to labor to be the only way out, then one can defi-

(Turn to page 212, please)

AS far as actual achievements are concerned the records comparatively seem to show a vast superiority for the employees representation plan or "company union," call it what you will. Works councils have definite and exclusive accomplishments to point to. Not isolated cases either, but actually hundreds of instances where requests by labor have been carried out by management.



(Top) Looking down on the massively ribbed Hupp "distortion" head which is bolted on just ahead of the honing operations

(Above) First and second honing operation on Hupp six-cylinder engine block using Hutto hones. Blocks come through with "distortion" head in place

(Right) Close-up of one of presses at side showing front section of Chrysler Airflow body with die exposed for examination



# Production H

OUT of the log of a recent trip through the factories we have culled a few high spots which may be of general interest. These are presented briefly and chiefly by illustrations.

Much has been said about improved methods of honing cylinders and the measures that have been proposed for eliminating cylinder distortion during machining operations. Hupp, apparently, has found a satisfactory solution in the production of the six-cylinder block.

As illustrated, Hupp uses a massively ribbed "distortion" head which is securely bolted to each block and stays with the block from a



(Above) Battery of fifteen new presses in Dodge plant is evidence of changes being wrought by modern body and fender stampings

# High Spots

By Joseph Geschelin

Engineering Editor, Automotive Industries

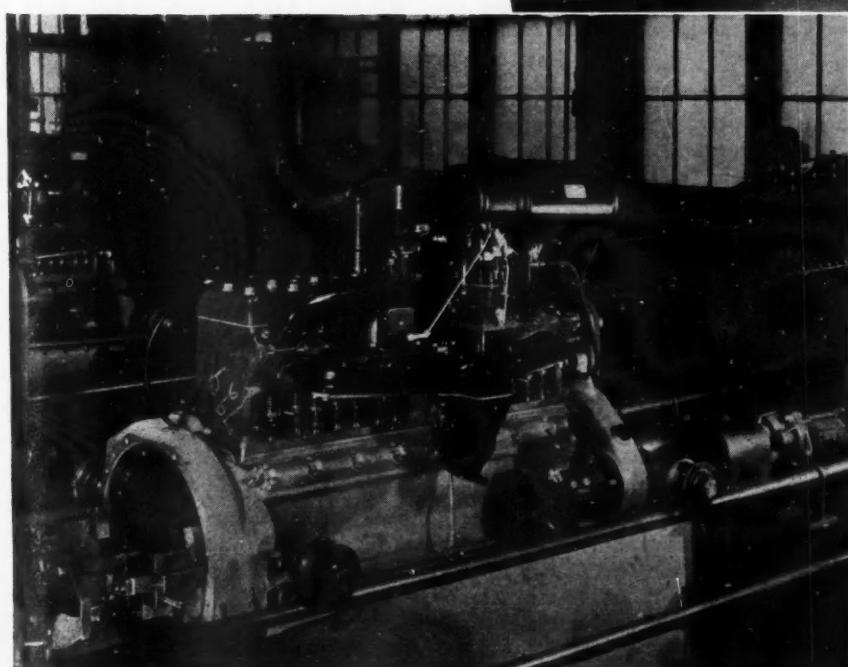
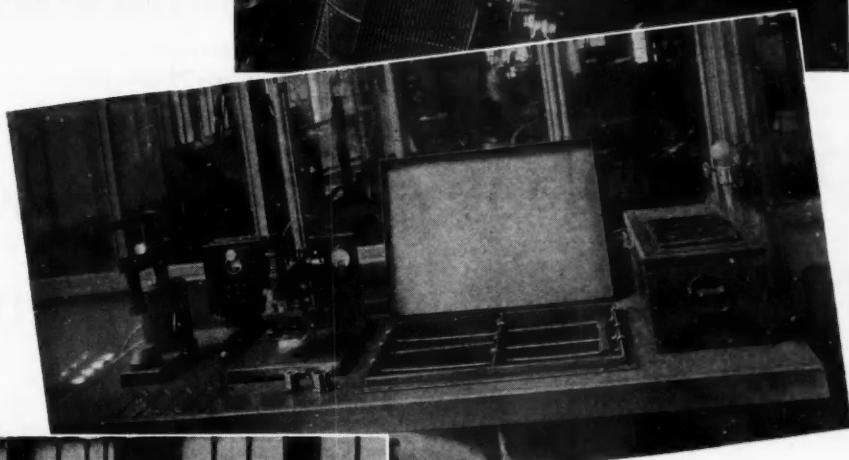
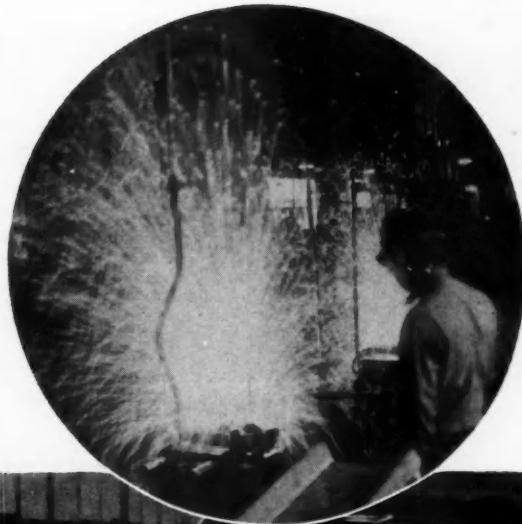
point just preceding the first honing operation through to the point where the standard cylinder head is normally assembled. Aside from the sub-assembly operations, the head remains in place during two honing operations and valve seat grinding, and is finally removed to make way for the regular head.

The "distortion" head is in reality a master cylinder head fitting interchangeably on the block. And in view of the nature of the process, it is necessary to have enough of the master heads available to take care of a maximum day's output of engines.

Illustration at the left shows the first and second honing operations at Hupp, with the "distortion" head in place. This double honing procedure is in line with current practice designed to produce a fine surface finish.

Now as to results achieved by the new method. With the original procedure cylinder bores would show localized wear opposite the studs adjacent to the bore. Wear was manifested in the form of spots about  $\frac{3}{4}$  in. wide and extending 1 $\frac{1}{2}$  to 2 in. from the top surface. On block tests quite a few engines

(Turn to page 212, please)

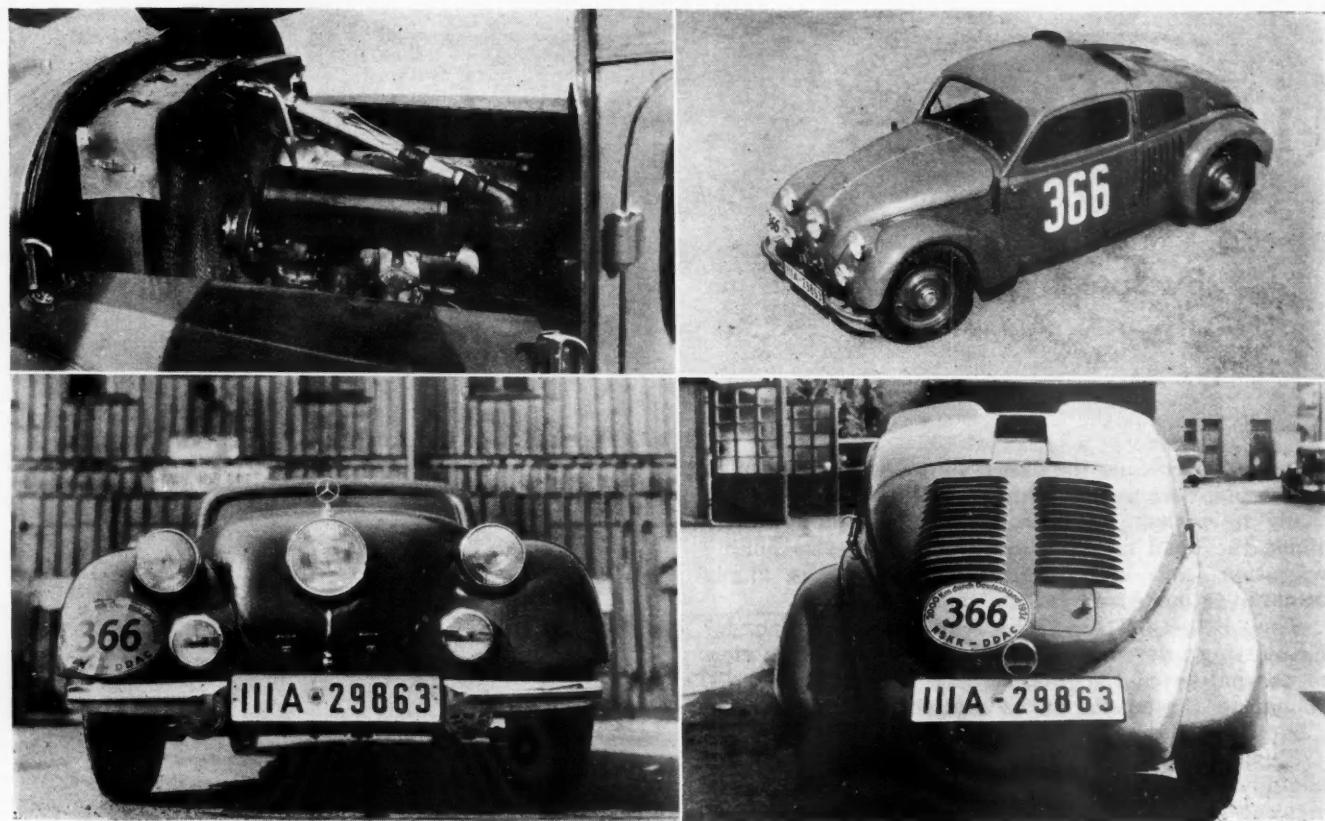


Sparks are flying in Dodge plant. Automatic arc-welding of metal ventilator frames

Final inspection of Oldsmobile paint and trim along the line. Bright light handled by fussy inspector brings out the flaws, if any.

Magnaflux tester installed in Ex-Cell-O plant locates flaws in steel and magnetic alloys

Packard assures alignment of transmission case by truing the flywheel housing after the engine is completely assembled. Turning tools operated by engine power



The above four photos show the new Mercedes rear-engined sports model in three-quarter front, front and rear views, and the mounting of its four-cylinder engine in front of the rear axle

## Power Plant Ahead of Back Axle in New Mercedes Rear-Engined Model

by Edwin P. A. Heinze

Berlin Correspondent, Automotive Industries

MERCEDES-BENZ have placed on the market a new small car with rear-mounted engine of 90-cu. in. displacement. It was introduced to the public on the occasion of the 2,000 km. reliability trial recently held in Germany in which seven of these cars finished in good form.

In the general arrangement of its parts the new model is similar to the 80-cu. in. rear-engined car introduced eight months ago, but changes have been made in the positioning of the engine and the general arrangement of the rear end. The engine is now in front of the rear axle, instead of in back thereof, which improves the distribution of weight, placing more weight on the front wheels, thereby improving the steering qualities.

A four-cylinder overhead-cam-

shaft engine is fitted, of 2.83-in. bore and 3.62-in. stroke, which develops 45 hp. at 4,000 r.p.m., according to the manufacturers, or 0.50 hp. per cu. in. displacement. It is mounted on a forked rear extension of the tubular backbone. Final drive is by worm gear, the worm shaft being made hollow so as to allow the clutch shaft to pass through it to the transmission case mounted back of the axle.

All four wheels are independently sprung, the rear wheels by single coil springs between the oscillating axles and the frame fork, the front wheels by double transverse half-elliptic springs which carry the steering heads between their ends.

The radiator being located above the rear axle, the front end of the car could be fully closed, and in its streamlined form are included five

headlights. The front hood is hinged at the bottom of the windshield and the space below it is used for carrying the spare wheel, tool box, etc.

The car has a wheelbase of 102 in., front and rear treads of 51 and 50 in. respectively, and is said to be capable of speeds up to 75 m.p.h. Riding qualities are said to be exceptionally good and the car is very stable on turns, owing to its low center of gravity.

Five additional models of the Perfect Circle piston expander are now in production, which brings the number of car and truck models which can be reconditioned by the use of these expanders up to 133. Perfect Circle piston expanders are used for aluminum pistons only and are individually engineered for each piston.



## PRODUCTION LINES

### Employer-Employee

Bureau of Personnel Administration has started a most stimulating service for those concerned with personnel relations. "Employer-Employee Relations" is a semi-monthly bulletin whose function it is to outline major trends in labor, digest the literature, and give well-founded opinions on the probable effects of pending legislation. We have scanned the first issues of Vol. 1 and like them.

### Creep Project

A plan for the experimental study of methods of evaluating load-carrying ability of metals under prolonged stress at high temperatures, is proposed by the joint ASME-ASTM research committee. Creep of selected materials will be studied by test runs to be carried on for three years. Results should evaluate the validity of various methods of approximation and extrapolation as well as the relation of short-cut methods to actual long time performance.

### Lubricant Deluxe

A new menace for petroleum appears on the horizon in Algeria. Most of us have heard of the misuse of alcohol as a mixture with gasoline for motor fuel. It is actually required in some countries having a dearth of petroleum supplies and where the people are not hard drinkers. The latest move on the part of the agricultural interests against the petroleum industry is that of Professor Bastet, of the Genie Rural de l'Institut Agricole d'Algerie, who has spent the last three years proving that olive oil is superior to a petroleum lubricant in gasoline automobile engines. Experimentation is now complete and locally produced olive oil as a lubricant is to be commercially exploited. It costs 23 cents a quart.

Certain requirements must, however, be met. The oil must contain no sulfur; its acid content must not exceed an oleic degree of 0.8; and the oil must be changed every 1200 miles. What prevents us from draining the present oil out of our crankcase today, however, is the requirement that the oil filter must be cleaned every 300 miles. Our goes 10,000, and such frequent changes would, we fear, be too much of a nuisance. We do intend, though, to put mayonnaise in our grease cups. It might come in handy for picnics. —from *Mining and Metallurgy*, Aug. 1934.

### Translucent Panel

You've seen the translucent instrument panel that embellishes the interiors of Graham and Hudson. We are told that three other cars, among them one of the largest producers, are about to adopt the same type of panel. The material is an urea plastic.

### Starts Here

One of those important trifles that characterize good service is a feature of Wissco wire coils. Each coil has a "Start at this End" tag for the convenience of the operator. Saves time, saves energy, prevents loss.

### Sprayed Die

The metal-spray process is being put to a novel use in the manufacture of imitation wood carvings. The same procedure can be applied to related jobs. A wooden mold is made which is the reverse of the desired carving, and by carving the wood it is possible to bring out the fine lines desired in the imitation carving. The mold is then sprayed with metal to such thickness that after the metal mask is removed, the mold will withstand the pressure necessary to pro-

duce the imitation carvings. In addition to giving finer details, this is said to be cheaper than the former method.

### Fine Feathers

With an eye to the aesthetic, Link-Belt has developed a treatment to beautify the hitherto utilitarian silent chain. From now on, the silent chain that you know so well will be called "Silverstreak." Most of the chain is blued. Washers and guide bars are treated to give a silvered finish. When the chain is in motion it has the appearance of a silver streak—hence the name.

### Export Spots

Sixty per cent of Buicks sold abroad are shipped completely knocked down for assembly in 15 foreign assembly plants. To make the job easier for the production department, the foreign market demands as wide a variety of color and interior trim combinations as does the domestic, and in addition many special extras. Costly hard-grain leather upholstery is in surprising demand, particularly in South America.

### Selecting Wheels

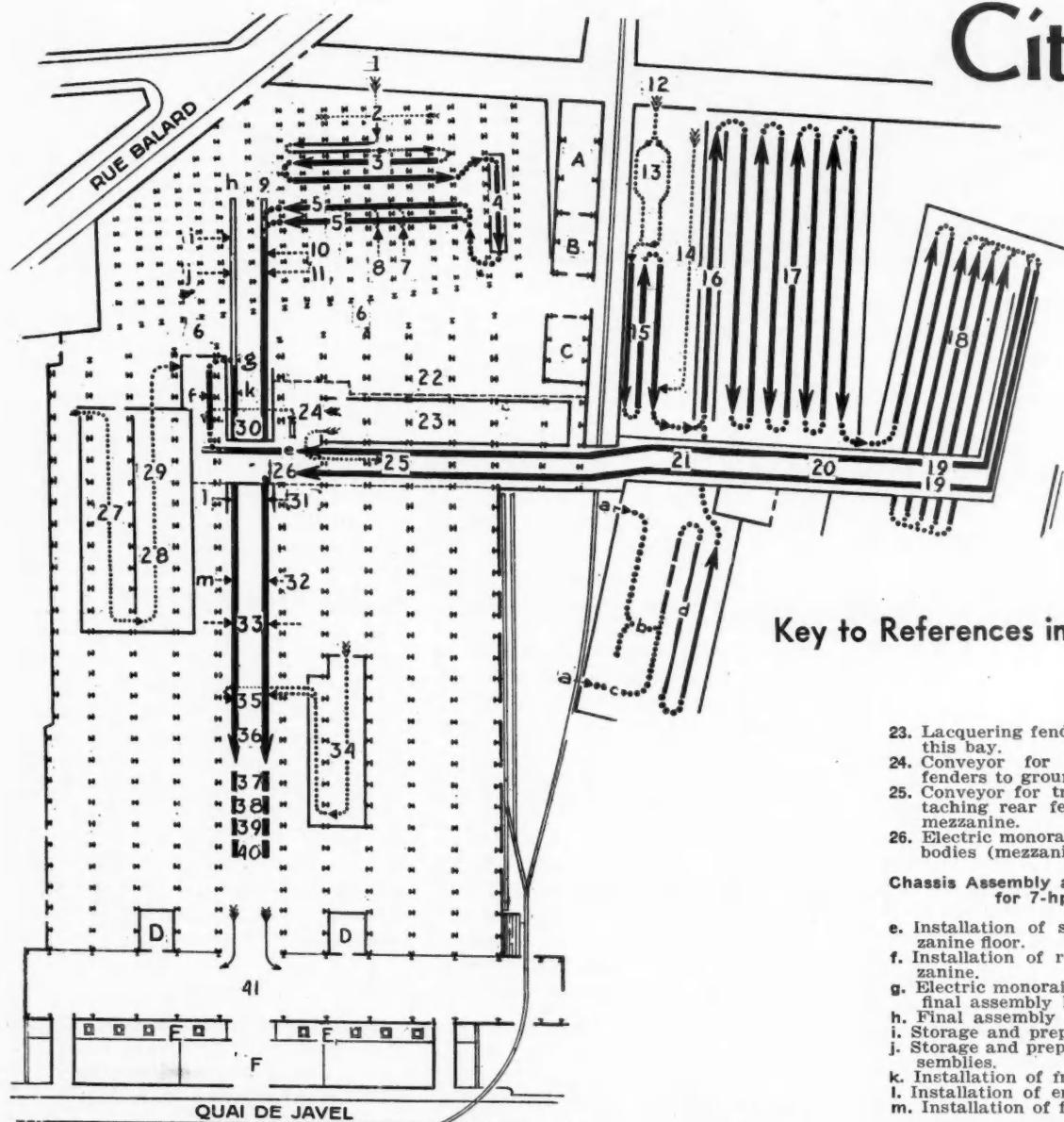
*Grits and Grinds*, Number 3 for 1934, makes an important contribution to metal cutting literature. It deals in detail with grinding wheel markings and wheel selection. The major section of the booklet is devoted to the specifications of wheels for specific parts and commonly-used operations. According to the experts who edited this issue, the most essential factors to be considered in the selection of a grinding wheel are:

1. Material to be ground.
2. Amount of stock to be removed, accuracy and finish.
3. Area of contact.
4. Type of grinding machine.

—J. G.



# Citroen's



## Key to References in Javel Floor Plan

- 23. Lacquering fenders, trunks, etc., in this bay.
- 24. Conveyor for transporting front fenders to ground floor.
- 25. Conveyor for transporting and attaching rear fenders to bodies on mezzanine.
- 26. Electric monorail for lowering 8 hp. bodies (mezzanine floor).

### Chassis Assembly and Final Assembly for 7-hp. Model

- e. Installation of steering gear, mezzanine floor.
- f. Installation of rear axles, on mezzanine.
- g. Electric monorail for lowering to the final assembly line.
- h. Final assembly line.
- i. Storage and preparation of engines.
- j. Storage and preparation of front assemblies.
- k. Installation of front assemblies.
- l. Installation of engines.
- m. Installation of front fenders.

### Finishing Operations and Final Assembly (8, 10, and 15-hp. Models)

- 27. Polishing division.
- 28. Automatic and semi-automatic copper-plating department.
- 29. Automatic and semi-automatic nickel and chromium-plating department.
- 30. Installation of front fenders.
- 31. Body drop and installation.
- 32. Installation of trunks.
- 33. Installation of hoods.
- 34. Preparation of wheels, mounting of tires.
- 35. Installation of the tire and wheel assembly.
- 36. Polishing and checking of the finished vehicles.
- 37. Filling station for gas, oil and water.
- 38. Equipment for checking wheel alignment.
- 39. Toboggans for final adjustment of cars.
- 40. Equipment for brake adjustment.
- 41. Drive away.

A. Main heating plant.  
 B. Central air-compressor installation.  
 C. Air-compressor electric sub-station.  
 D. Electric substation.  
 E. Garden and luminous fountains.  
 F. Office and Administration Building.

### Chassis Assembly of 8, 10, and 15 hp. Models.

1. Unloading of frame members.
2. Storage and preparation of side bars, cross members, etc.
3. Frame line—assembly and electrical welding.
4. Frame enameling department.
5. Start of chassis sub-assembly (two lines).
6. Chassis parts storage bay.
7. Storage, preparation and installation of front axles.
8. Storage, preparation and installation of rear axles.
9. Main chassis assembly conveyor.
10. Storage, preparation and installation of engines.
11. Storage, preparation and installation of steering gear, batteries and radiators.

### Model "7" Body Assembly

- a. Unloading of body stampings.
- b. Preparation and assembly of body structure.
- c. Final body welding line.

d. Body hardware is mounted along this line.

### 8, 10, and 15 hp. Model Body Assembly

12. Unloading of body stampings.
13. Electric welding of all-steel bodies.
14. Preparation of doors.
15. Body hardware is mounted along this line.

### Body Finishing Line for 7, 8, 10, and 15 hp. Models.

16. Cleaning line.
17. Painting line.
18. First finishing coat, mounting of windshield, linings, etc.
19. Conveyor for 8, 10, and 15 hp. bodies on mezzanine.
19. Conveyor for 7 hp. bodies or mezzanine.
20. Rub-down and striping of bodies on mezzanine.
21. Mounting of seats, cushions, carpets, on mezzanine.
22. Tin shop, finishing of fenders, trunks, etc. (ground floor).

# New Javel Works—

## One of the World's Outstanding Automobile Manufacturing Plants

WITH the completion of the new Javel Works, Citroen has probably one of the outstanding plants in the automobile world. Production equipment, mechanization and other features of the manufacturing department have been worked out in cooperation with the best authorities in each field, many of the features being based upon the latest experience in the United States.

The floor plan of the Javel Works, reproduced here, should be of great interest to factory executives. It embodies the best experience in mass production technique with a decided emphasis upon simplification, centralization of operations and reduction in materials handling by mechanization at every step. One feature, representative of the best practice in this country, is the location of subassembly and storage stations along the assembly line right at the point where the units are to be installed.

The plant consists of the main (ground) floor which houses most of the finishing operations, including the final assembly line. As will be noted from the floor plan and the explanatory table, operations 1-11, a-d, 12-18, are on the ground floor. Operations 19, 20, 21 are on the mezzanine, 24-26 being conveyor devices to transport various units to the ground floor.

Part of the chassis subassembly for the 7-hp. model is completed on the mezzanine, then it is lowered to the main assembly line, *h*, by the electric monorail, *g*. Final operations and adjustments are made at stations 36-40, the finished cars then being delivered to the drive away gallery, 41.

The photograph gives a perspective looking down the main assembly line, station 40, final brake adjust-

ment, being directly in the foreground. The mezzanine is also clearly visible to the right and left, with the body drop at the forward section of the cross-over in the background.

Despite the emphasis upon con-

centration and economy in handling, the plant layout has a feeling of spaciousness which in combination with the excellent lighting and paint treatment makes for ideal working conditions.—J. G.



Looking down the assembly line in the new Citroen plant at Javel. Body drop and one of the chassis drops from the mezzanine are located at the cross-over in the background

# British Research Throws Light on Worm Gear Design and Lubricants

In their paper "Apparatus for determining load-carrying capacity of extreme pressure lubricants,"\* Messrs. McKee, Bitner and McKee suggest the application of their machine to steel/bronze combinations in order to obtain data on lubricants for worm gears. A few notes on the work which the writer has carried out on this subject, using machines and methods identical in principle with those of the U. S. Bureau of Standards, may perhaps be timely in throwing further light on a subject of increasing importance.

Work on this question began in the David Brown Research Laboratory in 1930 when three machines were constructed with a view to investigating worm gear materials and lubricants. The design of the machine was based on the results of an earlier analysis of worm gear contact conditions, in order to reproduce as far as possible the actual stress and contact conditions obtaining in highly stressed automobile worm drives, and had for its object to determine the coefficient of friction with various combinations of material and lubricant, the effect of different ratios of sliding and loading velocity, and the rate of wear and breakdown load of various bronzes.

With so many variables, all the data which the machines are capable of affording have not yet been obtained, but enough work has been done to show the possibilities and the limitations of the machine, and to provide a foundation for future programs.

A preliminary statement of some of the conclusions drawn will show the scope of the work already done.

(1) Bronze of the type usually employed breaks down (by fatigue pitting) before the lubricant fails. High pressure lubricants show no advantage in ordinary running conditions. Increase in the hardness of the worm-wheel material may, however, bring them back into the picture.

(2) Observed breakdown pressures agree with full-scale worm gear tests.

(3) Coefficients of friction agree with full-scale worm gear tests:

(4) Of the physical properties of the lubricant which determine the co-

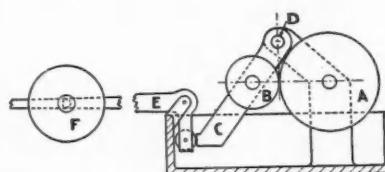


Fig. 1—Diagram of testing machine

efficient of friction, the specific gravity of straight mineral oils is more important than viscosity. Extreme pressure lubricants offer no advantage

from the point of view of reduction in friction.

(5) The nature of worm gear friction is quite unlike that of any other type of sliding surface, and no tests other than line-contact experiments on the actual combination of materials used are of any value.

(6) Steel and bronze as used for worm gears will carry loads under worm gear contact conditions at which all the steel and steel combinations investigated break down.

(7) Because the machine does not reproduce exactly the relative tooth motion of worm gears (in which the line of contact and direction of roll are inclined to the velocity of sliding) the effects of the degree of surface finish which it may disclose do not necessarily agree with results obtained from actual worm gears. This applies particularly to hard worm wheel materials, such as high nickel bronze or cast iron.

#### First Principles

In designing the "DBS" machines, the following considerations were borne in mind:

(a) The specimens should be large enough to be produced under the same conditions as actual worms and wheels, with reference to the David Brown centrifugal process of casting worm wheels. This fixed the diameter of the bronze specimen at 8 in.

(b) The machine should permit loading, in terms of length of line of contact and surface curvature, comparable with actual worm gear loading.

(c) The machine should serve to measure coefficient of friction directly.

As already mentioned, a good deal of analytical work had previously been done on worm gear tooth forms in order to determine zones of contact, lengths of contact line, and mean relative radius of the engaging surfaces along the line of contact, and at the time the machines were built the method adopted for expressing the intensity of line contact pressures was as follows:

Specific surface stress

Load lb. per inch of line contact

=

Mean relative radius of curvature

This can easily be correlated with

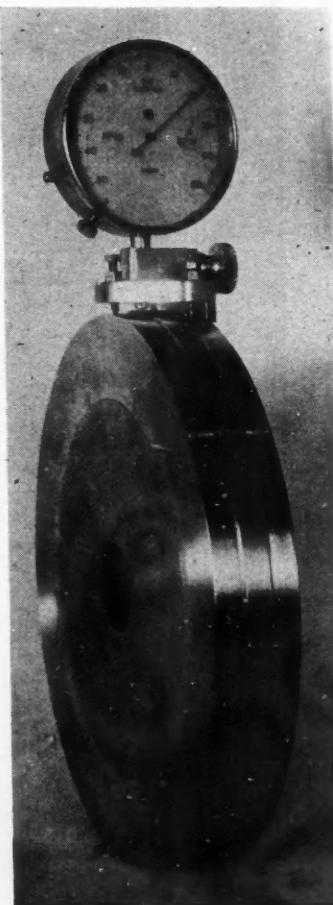


Fig. 2—Instrument for comparative measurement of diameters

\* *Automotive Industries*, Aug. 26, 1933, page 250, and *S.A.E. Journal*, Dec., 1933.

# New Light Lubrication

by Henry E. Merritt, D.Sc.,  
M.I.A.E.

Research Engineer, David Brown & Sons  
(Huddersfield) Ltd., England

the Hertz formulae, although the latter treatment is not necessary for purposes of design and comparison.

Ultimately, however, investigation of the service results of gears of a variety of types and sizes, from worm gears to turbine reduction gears, indicated that some modifying factor entered into the question. It was concluded that this factor was the presence of the oil film and that the load was actually carried partly by a narrow and substantially parallel oil film under boundary lubrication conditions, and partly by a wedge film giving true hydrodynamic lubrication. This is borne out by the reduction in coefficient of friction with increase of relative velocity and also with increase in the proportion of rolling to sliding. It also appeared that the effect of the wedge film, under given contact conditions, was relatively less as the relative radius of curvature increased, and the basis of comparison of surface pressure was modified, taking the form Specific surface pressure

$$= \frac{(\text{load (lb.) per inch of line contact})}{(\text{Relative radius of curvature})^{0.8}}$$

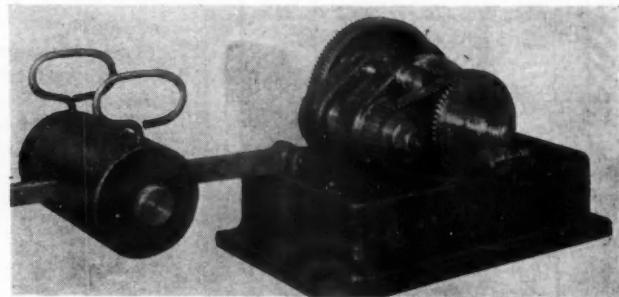
This must be regarded as empirical, although it serves very well for commercial design purposes; perhaps some leisured mathematician will investigate the matter further.

Actual automobile rear axle worm gear surface stresses calculated on the above basis, usually run to between 2000 and 3000 lb. inch units at full torque in low gear.

**The Machine.** Two sizes of machine were constructed of which the larger has been mainly used, and as the tests are of rather long duration, two of this size were employed. The arrangement is shown in Fig. 1: the discs work at a center distance of 6 in., and have diameters of 8 in. and 4 in. respectively. The width of the test surface is  $\frac{1}{4}$  in. for friction tests and  $\frac{3}{8}$  in. for fatigue tests. Thus on the original stress basis, if  $P$  = applied load (lb.)  $Sc$  = specific surface stress,  $f$  = face width, and  $R_1$ ,  $R_2$  = radii of the discs

$$Sc = \frac{P \left( \frac{1}{R_1} + \frac{1}{R_2} \right)}{f}$$

Fig. 3—4 by 8-in. machine with cover removed, showing chain connection between spindles



For the  $\frac{1}{4}$  in. discs

$$Sc = \frac{P \left( \frac{1}{2} + \frac{1}{4} \right)}{\frac{3}{4}} = P$$

and for the  $\frac{3}{8}$  in. discs

$$Sc = 2P$$

This of course rather lost some of its simplicity when the exponential had to be introduced.

Again referring to Fig. 1, the large disc  $A$  is mounted on a  $1\frac{1}{4}$ -in. diameter parallel splined shaft carried in roller bearings in a fixed bracket, while the small disc  $B$  is carried similarly in a pivoting bracket  $C$ , the latter swinging on an axis pin  $D$  lying in the common tangent plane to the surfaces of the discs. The pressure between the discs was provided by a cranked lever  $E$  carrying a sliding jockey weight  $F$ , the lever being graduated in lb. actual load between the discs. This arrangement was adopted to permit easy progressive loading by an external motor and lead screw, much as in the Bureau of Standards machine, but was not actually used in this way, the load having been finally

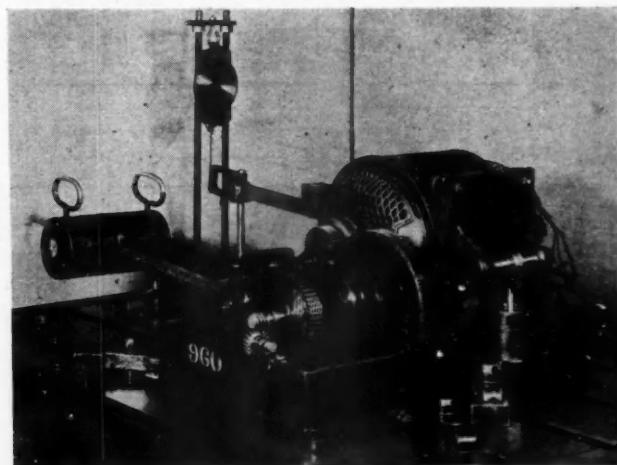
increased in steps of 100 lb. and a time switch fitted to stop the run after 100,000 revolutions of the main disc  $A$ .

In order to obtain any desired relative rolling/sliding motion, the spindles of the discs may be connected either by gears, giving opposite directions of rotation and high rolling, or by chains, giving the same direction of rotation and high sliding. Chain connection is mainly used, varying the chain sprocket ratios as desired. The drive to the whole is by a swinging frame variable speed motor (the torque of which can be measured by calibrated spring balance to 0.5 lb.-in.) either directly or by intermediate gear reduction to the spindle of the disc  $A$ . This spindle drives a revolution counter geared down to 10:1.

The discs are lubricated by a bath of oil formed in the box, the larger disc dipping about  $\frac{3}{4}$  in. An electric immersion heater raises or controls the temperature of the oil.

The form of the actual test discs is shown in Fig. 2. The small disc, of steel, is parallel and  $1\frac{1}{4}$  in. wide,

Fig. 4—Another view of the testing machine, with cover removed



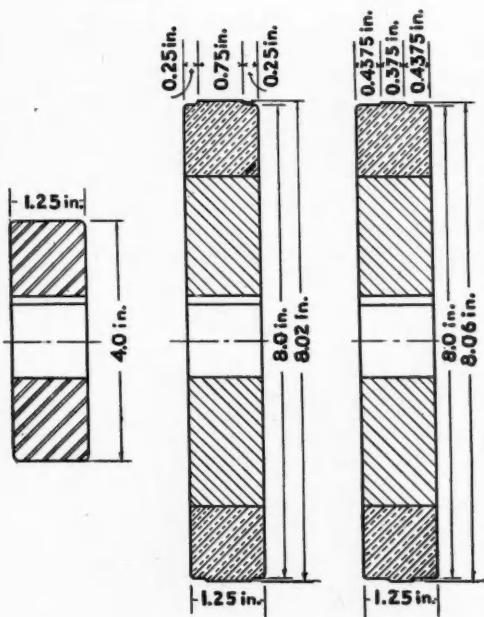


Fig. 5—Forms of disks used in the tests

while the larger is provided with a working face either  $\frac{3}{4}$  in. or  $\frac{5}{8}$  in. wide, and two slightly smaller reference surfaces for taking measurements of diameter. The actual measurement is made by a Capstan dial indicator graduated to 1/10,000 in. and mounted on a three point support, two on one reference surface and one on the other, with two further locating points bearing on the side of the disc to hold it square.

A master disc with working and reference surfaces of the same diameter enables the zero reading for any disc to be taken and recorded so that any shift in the instrument may be corrected. This method of measurement was found always, to repeat exactly and is more accurate than diameter or weight measurement, and avoids temperature errors.

*Measurement of coefficient of friction.* Assuming that the only point at

which friction occurs during operation of the machine is between the test surfaces, the torque exerted by the driving motor is a direct measure of the coefficient of friction for any given condition of relative speed and loading.

If  $D$  and  $d$  are the diameters of the large and small discs respectively,  $R$  the gear ratio  $= \frac{\text{Speed of } d}{\text{Speed of } D}$ ,  $P$  the applied load between the discs and  $T$  the torque applied to the spindle of the larger disc at a speed of  $N$  r.p.m.

$$\text{Sliding velocity} = v_s = \frac{\pi N}{12} (D \pm Rd) \text{ ft./min.}$$

The plus sign is used for chain connection, and the minus sign for gear connection.

Further, the torque required to overcome friction will be

$$\mu P$$

$$T = \frac{\mu P}{2} (D \pm Rd)$$

or

$$2T$$

$$\mu = \frac{2T}{P (D \pm Rd)}$$

There are, however, certain corrections to be made. Chief of these, in addition to zero error and calibration of the driving motor torque meter, are the no-load loss in the bearings due to oil drag, load loss in the bearings, and change in the applied load due to the driving effort in the connection between the gears.

No-load bearing loss is allowed for by running the machine over its range of speed at normal temperature with the discs barely touching: this gives also the equivalent zero error and calibration of the driving torque. The error due to the tension in the driving chain is reduced to a minimum by making the upper line of chain (nearest the bracket axis) the driver; this error is then negligibly small. Beyond this, all friction has been reduced to the resultant friction between the specimens: the relative rolling and sliding friction and the load loss in the bearings have not been separated.

Fig. 3 shows a typical result, using

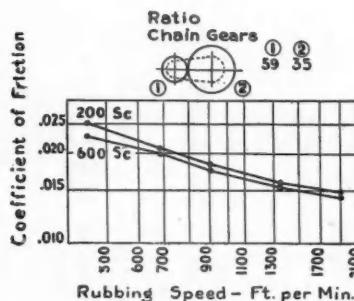


Fig. 6—Variation of friction coefficient with rubbing speed for two loads (600 and 1200 lb.)

12 per cent tin, 88 per cent copper bronze centrifugally cast,  $3\frac{1}{2}$  per cent nickel case-hardening steel, 90 sclerometer, lubricant castor oil, with a gear ratio 35:59. Two curves are given, for loads of 600 and 1200 lb. respectively, showing that the effect of thus doubling the applied load increases the coefficient of friction by between 5 per cent and 10 per cent. The curves obtained by substituting Nitralloy for nickel case-hardening steel are identical.

*Effect of gear ratios between discs.* Changing the ratio of the speeds of the discs alters the relative rolling and sliding velocity and the effect is reflected in the value of the coefficient of friction.

Fig. 4 shows a typical series of curves obtained by varying the ratio of the chain sprockets using an oil consisting mainly (about 90 per cent) of castor.

The highest values are obtained when the velocities are most nearly equal and opposite (chain ratios 35:59). As the chain ratio is reduced (slowing down the surface velocity of the steel disc in relation to the bronze) the coefficient of friction diminishes. These curves repeated over a number of tests using castor-base oils.

The coefficient of friction is a measure of the surface-separating value of the oil film, the thickness or effectiveness of the latter being the resultant of two opposing tendencies: namely, the effect of pressure on the one hand tending to expel the oil, and whatever properties the lubricant or the conditions of contact may possess which tend either to renew the film or to prevent its destruction. This point is of great importance in guiding the design of worn threads and wheel teeth for maximum efficiency.

Either the oil may be introduced by viscous drag at a rate equal to that at which it is expelled by pressure, or the affinity of the oil for the surface may at a certain point equal the expelling effect. If the former, the criterion is the mean velocity of approach,  $= \frac{v_{rA} + v_{rB}}{2}$  allowing for the

fact that with chain connection these will be of opposite sign. Applying this to Fig. 4, it will be found that the coefficient of friction is not proportional

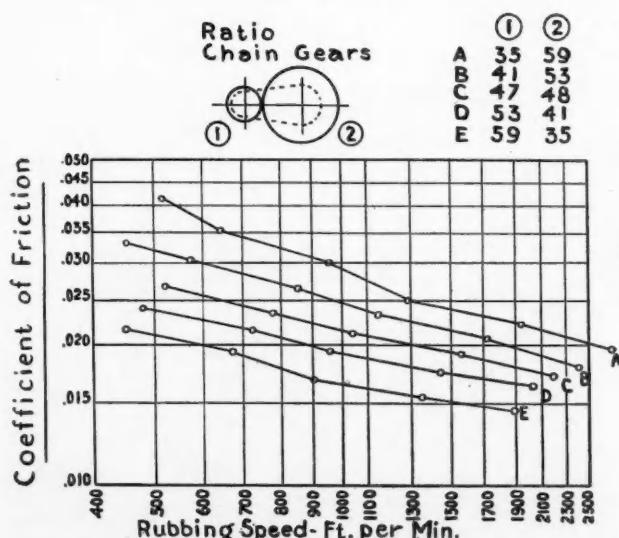


Fig. 7—Results obtained when using a castor-base lubricant

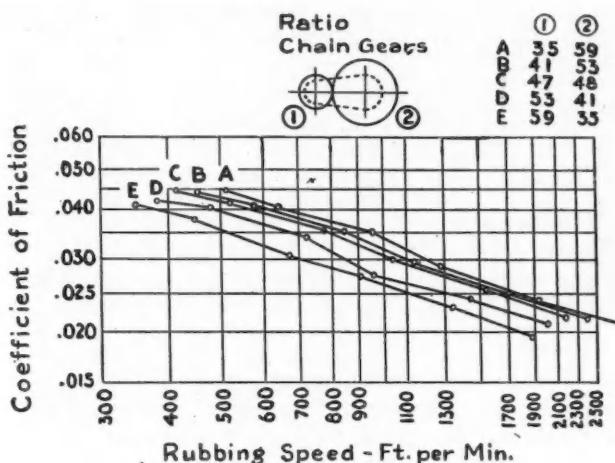


Fig. 8—(Left) Results in the same tests as those of Fig. 4 but with a black gear-oil lubricant

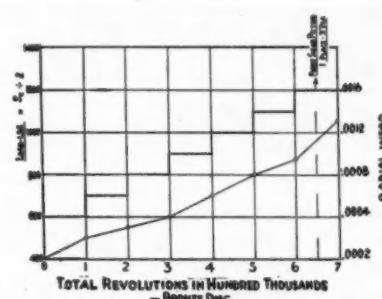


Fig. 9A—Load and deformation curves of phosphor-bronze disk close to chilled surface

to the mean velocity of approach. Further, it is not proportional to the sum of the rolling velocities, a measure of the rate at which newly lubricated surfaces are brought into action.

The problem is further complicated by Fig. 5 which shows the result of a similar series of observation using an ordinary black gear oil such as 600W. These curves show that while the coefficients of friction are all higher than with castor oil, the effect of increasing the viscosity drag effect is relatively less. When these two curves are studied, they contradict what might be the preconceived opinion that, if viscosity drag is important in offsetting expulsion by pressure, and if the primary cause of the superiority of castor oil over mineral oils is greater affinity for the surfaces, the effect of increasing the viscosity drag should be more marked with mineral than with castor oil. The reverse is the case. These curves also indicate that improvements in worm gear design should be more marked when castor oil, than when mineral oil, is used. This is confirmed by

of compounded oils increases with the percentage of compounding.

*Fatigue tests.* Although the nature of the lubricant greatly influences the coefficient of friction, and hence the gear efficiency, the prime design limitation from the point of view of dimensions is that of surface breakdown of the materials. This occurs by pitting, which is a fatigue failure, and commences at surface pressures at which the oil film, as measured by determination of coefficient of friction, shows no sign of breaking down.

Experiments on pitting and surface deformation are usually carried out concurrently. The discs are started up with a comparatively small load which is increased at intervals until signs of failure of the surface of the bronze disc are noted. At the time of each increase in load the radius of the disc from the reference bands is measured.

The load at which any given disc will fail depends upon the number of repetitions between each increment of load, i. e., the greater the rate of increase in load, the higher the load and the

smaller the number of repetitions before failure occurs. Only tests run under the same conditions are therefore comparative.

Figs. 6A and 6D show the load and deformation curves for a 12 per cent tin phosphor bronze, cast with three-sided chill, firstly close to the original surface and secondly with one inch turned off the diameter. Both tests were commenced with 600 lb. load on 0.375 in. face width, increasing the load by 100 lb. every 100,000 revolutions. The discs were lubricated with castor oil and run at 250 r.p.m. Thus whereas in the harder exterior layers the first failure occurred after 1,000,000 repetitions at a load of 1500 lb. ( $Sc = 3000$ ) and with 0.0006 radial deformation, the softer material near the limit of the effect of the chill failed more severely at 1200 lb. ( $Sc = 2400$ ) after 650,000 repetitions, the radial wear up to a load of 1100 lb. being 0.00095.

The observed radial deformation consists partly of actual wear, but mainly of plastic deformation. This is illustrated by Fig. 7, which shows the re-

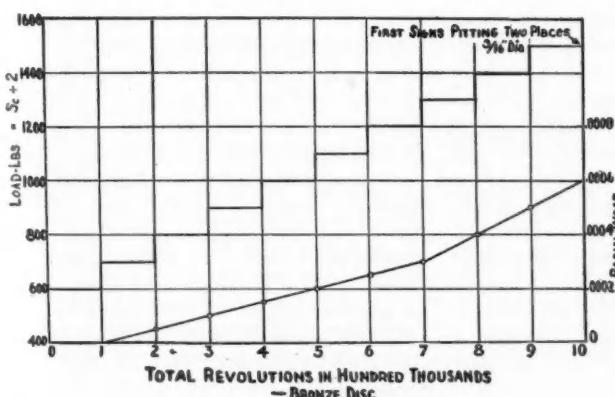


Fig. 9B—Load and deformation curves of phosphor-bronze disks 1 in. below original surface

experiments on actual worm gears of different forms. A further conclusion is that to obtain full advantage of more highly developed worm gear design, lubricants with a curve-spread similar to Fig. 4 are needed. In this connection it has been found that the curve spread

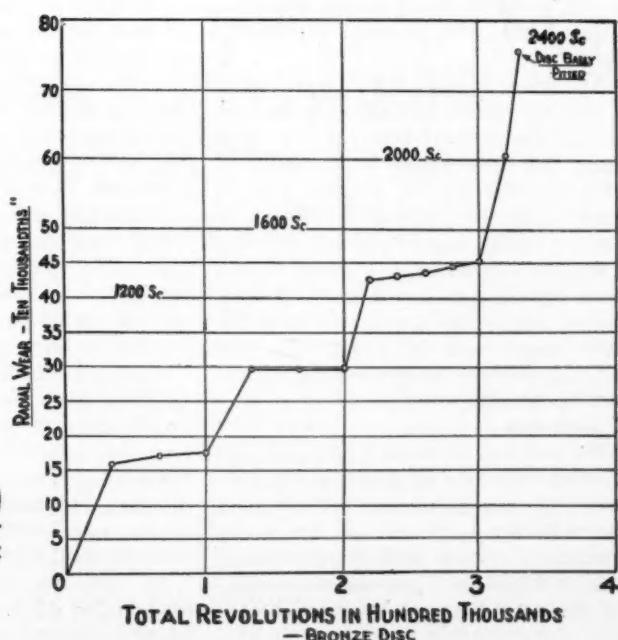


Fig. 10—(Right) Wear of phosphor-bronze disk

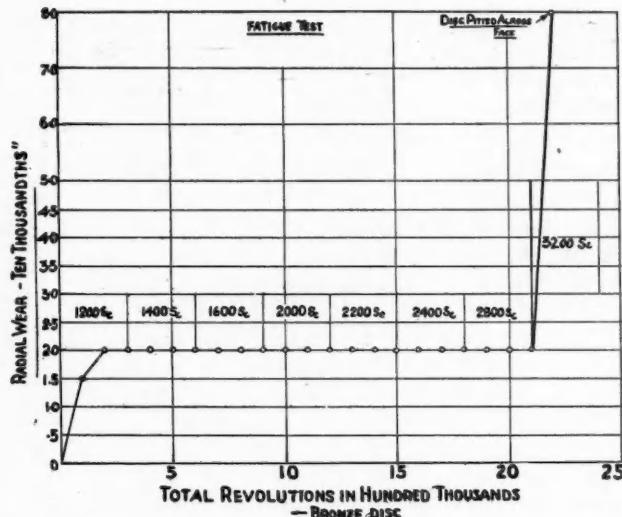


Fig. 11—Wear on centrifugally cast phosphor-bronze disk

sults of a test on a 10.5 per cent tin phosphor bronze, sand cast. Measurements taken during a run under steady load indicate that the first deformation soon occurs and later steadies off to a negligible amount. In fact, up to about  $Sc = 1600$ , actual wear after the initial deformation is practically nil.

Fig. 8 shows a similar test on 12 per cent tin phosphor bronze, centrifugally cast. This specimen was tested under the same conditions as the sand cast material and, as will be seen from the graph, there was not a fraction of a tenth of a thousandth measurable wear during nearly two million revolutions, during which time the load increased from  $Sc = 1200$  to  $Sc = 2800$ . The foregoing examples are only

typical of some of the results obtained. There remain a host of other aspects such as the influence of the composition of the bronze and the steel on the coefficient of friction, the behavior of materials other than bronze as worm wheels, the effect of surface finish, the conditions under which seizure occurs; all have a bearing on the general worm gear question. The main object of the foregoing notes was merely to indicate what results are to be expected and what provision should be made in designing and using the rolling disc type of apparatus. Thanks are due to Messrs. David Brown & Sons (Huddersfield) Ltd., England, for permission to publish the foregoing.

## Production High Spots

(Continued from page 203)

had to be rejected for blow-by. When such engines were torn down for detail inspection the piston fit was found to vary from the original fit. Valve seats, too, showed permanent distortion.

Accurate studies have been made of engine condition following the use of the "distortion" head. In the first place, the production department reports practically no rejects due to blow-by on the block test. Most important is the fact that upon tearing down the engines for a recheck, the wear spots are no longer visible, rings show uniform wear-in, and the valve seats remain concentric and flat. Moreover, the piston fit in the bore is sensibly the same as it was at assembly.

We mentioned some time ago that the requirements of new body panels and fender designs had outstripped the capacity of much of the press equipment which had done yeoman duty and that new presses were making their appearance here and there. They are certainly very much in evi-

dence at the Dodge plant as may be judged from the view which shows a battery of fifteen presses.

Over at Packard nothing has been overlooked to assure the accurate alignment of clutch housings, so essential to satisfactory transmission performance. To this end, the bell housing is finish-machined only after the engine has been completely assembled. In this fashion the turning operation is directly from the crank-shaft and flywheel. This is seen in the view that shows an assembled engine with turning tools mounted on the flywheel and driven by the engine itself.

Magnetic testing of highly stressed finished parts is rapidly growing in application. One the latest production machines for this purpose, the Magnaflux Tester, for locating flaws in steel and magnetic alloys was recently installed at the Ex-Cell-O Aircraft & Tool Co. plant in Detroit.

In principle, the method consists essentially of magnetizing the part to be inspected by a six-volt electro-

magnet with adjustable pole pieces on which the parts to be tested are supported. After the part is magnetized it is submerged in a solution of oil and kerosene to which an iron powder known as "Magnaflux" has been added and by agitation it is kept in the solution. Cracks or defects on the surface or below the surface in the magnetized section produce magnetic flux leakages at these points. The powder in the solution conforms or sticks to the points of greatest flux density, clearly outlining the defect in the metal. The part is then submerged in a solution of tetrachloride or kerosene and the first solution and surplus of the powder are washed off, leaving the powder adhering to the surface of the part around the crack or defect. Following this inspection the parts are demagnetized.

If it is not desirable to use the powder in the solution form it can be used in the dry form and dusted over the part that has been magnetized and the surplus powder gently blown off. The powder will reveal the most minute surface or sub-surface defects with the same accuracy as when it is used in solution form.

The foregoing are just a sample of some of the present activity in the automobile world.

## Do Works Councils Work?

(Continued from page 201)

nitely say that the works council idea has not succeeded.

Judged on that basis it would seem that on the whole employee representation plans are working successfully in the automotive industry. Certainly non-professional union labor is quieter and more content today in those plants where works councils are actively operating than just before their inception or at different periods since that time.

It is more than probable that the spirit of cooperation and mutual understanding, put into practice, and engendered by actual operation of works councils, for both men and management has been a vital factor in bringing about the already noticeably improved conditions of employee relations.

It can be said today that even if the NRA were to be abandoned along with Section VIIa, that not one of the major corporations would drop the works council. These plans may not have reached their most productive potentialities as yet, but they have definitely indicated a value to both men and (particularly) management that makes their continuation almost a foregone conclusion.